MOTOR AGE

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No. 15

CHICAGO, OCTOBER 11, 1917

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Three dollars a year

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Prevents Frozen Radiators

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Johnson's Freeze-Proof does not evaporate with the water. One application is sufficient for the whole winter unless the solution is weakened by leakage.

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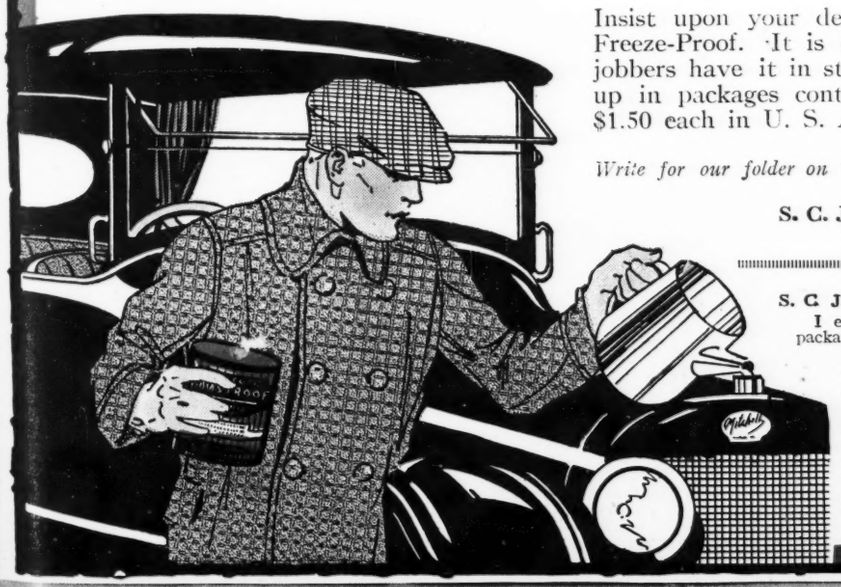

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In This Issue—Forestalling Winter Troubles

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A standard among speed-recording instruments as the Elgin watch is a standard of timekeeping.

Reliability and accuracy distinguish them both.

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Vol. XXXII, No. 15 Chicago, October 11, 1917 $3.00 Per Year

FORESTALLING WINTER TROUBLES

BY B. M. IKERT

ARE you going to keep on driving this winter or lay up the car? In either case there are several things of paramount importance to look after and especially in the former case beforehand preparation is necessary. Years ago the motor car demonstrated its fitness as a conveyance in cold and wintry weather, so we find more and more owners taking advantage of this fact by keeping the car in commission the year round.

Many users have been deterred from winter driving on the assumption that it has a destructive effect upon the car. Admittedly it may be somewhat harder on tires, although there are arguments to the contrary. It has been held that oiling is inefficient, parts subjected to breakage and that paint and varnish suffer from cold weather driving to say nothing about freezing up the water system.

These may all be true to some extent, but they can be fortified against, and now, before the real cold comes, is the time to do the work. Modern tops, adjustable windshields, tire chains, foot warmers, primers, electric starting and lighting systems all go to make winter driving as great a pleasure as in summer. Modern carburetors are provided with heating and regulating devices, which not only make the engines easier to start at low temperatures but insure regular running irrespective of weather conditions. So far as the engine is concerned if we can approximate summer conditions under the hood, it will give the same efficient service and as it constantly is generating heat, there should be no difficulty in bringing this about.

Obviously there are certain rural sections of the country where heavy snowfalls block the roads for long periods and make successful operation of motor vehicles impossible. The only recourse here is to lay up the car and await the spring thaws. Sometimes climatic conditions like these prevail for a few days only, following which may come a spell of comparative warm weather. Under such conditions, car owners can jack the car up temporarily with tire-saving jacks or something similar during the snowy weather and take the car out again on the others, thus not being deprived totally of the machine's use. Whatever course the owner chooses, the fact remains that the car must be in shape for the cold weather, regardless of whether it will be on jacks or the streets.

The radiator and waterjackets are in the front line trenches when the icy blasts make their attack, and it is well to throw up suitable fortifications for them, especially the radiator, inasmuch as the jackets

EDITOR'S NOTE—This is the first of a series of articles pertaining to winter driving. Each winter sees more and more cars being used, which heretofore have hibernated during the cold season. Beforehand preparation is essential, for there is no more exasperating situation than to have the car go wrong when all this could have been avoided

Oct. 18—Care of the Electric System

Oct. 25—Car Heaters and Garage Heaters

Nov. 1—Anti-freeze Solutions

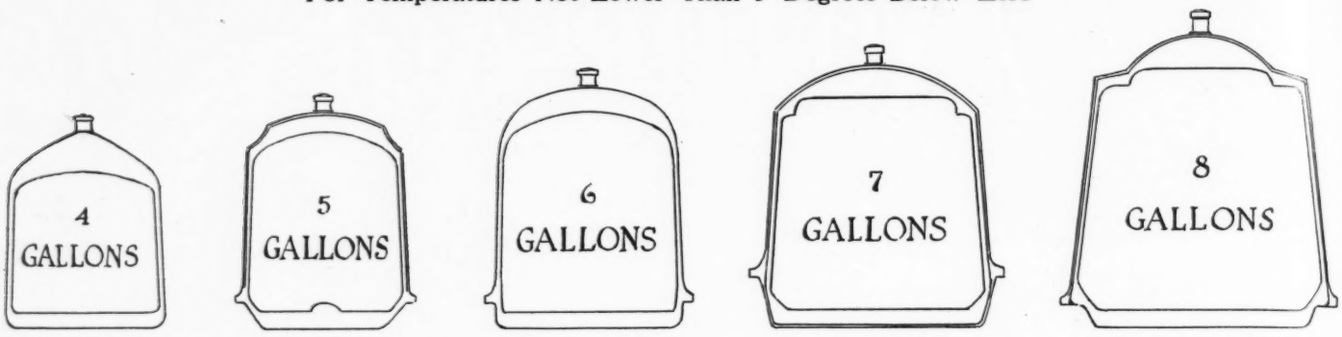
Nov. 8—Care of Tires in Winter

Nov.15—Winter Carburetion

Nov.22—Laying Up the Car

Proportions of Alcohol, Glycerin and Water According to Capacity

For Temperatures Not Lower Than 5 Degrees Below Zero



4 gallons	5 gallons	6 gallons	7 gallons	8 gallons
2½ qts. alcohol	3 qts. alcohol	3½ qts. alcohol	4 qts. alcohol	4½ qts. alcohol
2½ qts. glycerin	3 qts. glycerin	3½ qts. glycerin	4 qts. glycerin	4½ qts. glycerin
11 qts. water	14 qts. water	17 qts. water	20 qts. water	23 qts. water

For temperatures lower than 15 deg. below zero the solution is alcohol, 17 per cent; glycerin, 17 per cent; water, 66 per cent.

automatically will be protected at the same time. The radiator is a sort of Achilles heel for the motor car, for the oil in the crankcase might congeal, the fuel be so cold as to make its vaporization impossible, etc., but once the water in the radiator freezes, it usually means parting with considerable money for a new core or engine parts.

Getting Radiator Ready

To prepare the radiator drain off all the water and fill with a solution of hot soda. Let this stand for a few hours and drain it, flushing the radiator with clear water. Go over all the hose connections and flange joints to make sure there are no leaks. If the car is to be left standing out in the open for more than an hour or so at a time, with the engine not running, the radiator must be filled with an anti-freeze solution of water, alcohol and glycerin, the proportions varying with the temperature as follows:

Will not freeze at 15 deg. above zero;	
Water	4 gal.
Alcohol	½ gal.
Glycerin	½ gal.
Will not freeze at 8 deg. above zero;	
Water	3¾ gal.
Alcohol	5 pt.
Glycerin	5 pt.
Will not freeze at 10 below zero;	
Water	3 gal. 1 pt.
Alcohol	1 gal. 1 pt.
Glycerin	2 gal. 1 pt.
Will not freeze at 20 deg. below zero;	
Water	1 gal. 1 qt.
Alcohol	2 gal. 2 qt.
Glycerin	1 gal. 1 qt.

Alcohol has the disadvantage that it evaporates rather rapidly and boils below the boiling point of water. The virtue of glycerin is that it raises the boiling point and is not dissipated. Therefore a little alcohol should be added to the solution from time to time.

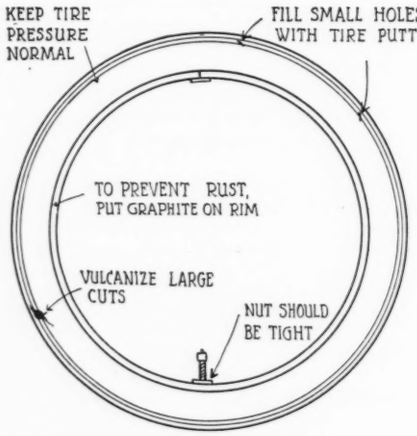
The cost of an anti-freeze solution will be excessive, inasmuch as the cost of alcohol and glycerin constantly is increasing. At present the retail price of alcohol in the north central states is about $1.50 a gallon, while that of glycerin is something like $1.25 a pint. The price will vary in different parts of the country.

There are on the market anti-freeze solutions which come ready to be put into the radiator. These are cheaper than the alcohol-glycerin preparations and will be discussed in a later issue.

There are to be had suitable radiator covers fitted with front curtains that can be lowered when the car is left standing, thus keeping off the cold air. Also by regulating this curtain the correct amount of air will be forced through the radiator when the car is running. Cars having thermostatic control over the shutters in the radiator take care of the opening automatically. It is also good practice to throw a robe over the hood when stopping for any length of time to keep the warm air under it. It is well to look for ill-fitting joints where the hood rests on the radiator shell and body. Usually leather padding here prevents rattle and water from getting to the engine. If these joints or any of the others in the hood are leaky, short-circuiting of the plugs or magneto might result if rain found its way in through them, and what could be more aggravating than to search out ignition trouble in a rain or sleet storm? The remedy is to fit new leather or fabric for the hood to rest on, making sure that the hood clasps hold it down firmly.

To Get the Car Ready for Winter

1—Fill the radiator with anti-freeze solution
2—Fit a radiator cover
3—Clean the chassis and put fresh grease in steering joints, etc.
4—Waterproof the top
5—Provide means for heating intake manifold
6—Use softer grease in differential, universal, etc.
7—Clean the sediment traps in fuel line
8—Install a suitable heater
9—Adjust the brakes and steering gear
10—Fill small holes in tires and vulcanize the large ones

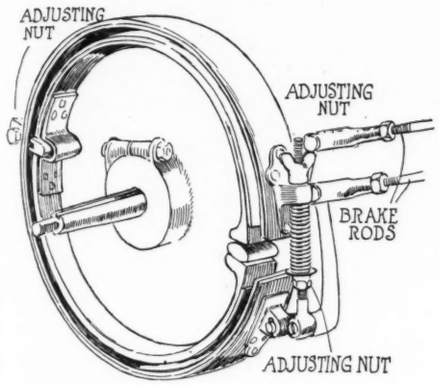

KEEP TIRE PRESSURE NORMAL
FILL SMALL HOLES WITH TIRE PUTTY
TO PREVENT RUST, PUT GRAPHITE ON RIM
VULCANIZE LARGE CUTS
NUT SHOULD BE TIGHT

Tires must be looked after in winter more than ever. Leaky tires soon bring disastrous results when driven in an unfit condition in winter

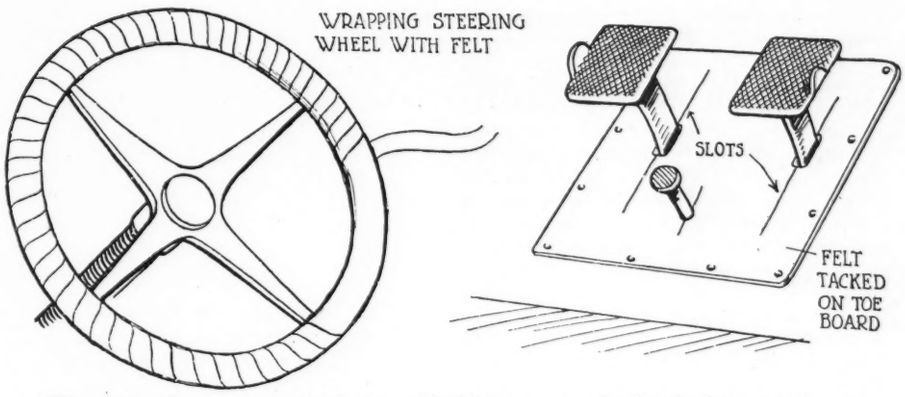
Clean the Chassis

The whole chassis should be gone over with soap and water, especially underneath where most of the parts, owing to their hard-to-get-at positions, frequently are overlooked. Such parts as the universals, steering joints, brake members, etc., should receive special attention to protect them from water and ice. Plenty of grease applied to these parts will counteract the detrimental action of the water. Leather boots on the steering joints will help to keep out snow and mud to some extent, but they should first be filled with plenty of grease. Cold makes all lubricants less fluid; therefore such parts as the differential housing, universals, etc., which are not warmed by the engine, can be supplied with a special lubricant which will keep its fluidity at low temperatures. All the grease cups should be filled with a softer non-fluid oil. In extreme cases it may be necessary to use a slightly lighter grade of oil in the engine, but so far as possible no change should be made from the regular grade used in the warmer months, especially if the car is housed in a warm garage. Always before the car is taken out in winter, the engine should be run slowly for several minutes to give the oil a chance to loosen up.

Gasoline conservation should be exercised in winter as much as in summer. We all know that more fuel is used in winter than in summer, so be careful of the way of handling the car. It is bad policy to start out with the engine still quite cold, for you will have to feed a rich mixture to keep it going and this is wasteful. Keep your eye on the motor-meter. It will show you whether your engine is working at



The brakes must take hold equally on each side and if the lining is in poor shape it must be renewed



Wrapping the steering wheel rim with felt prevents the hands from getting too cold. To stop the inrush of cold air around the pedal openings felt can be tacked on the footboard, cutting slots in the felt for letting the pedals through

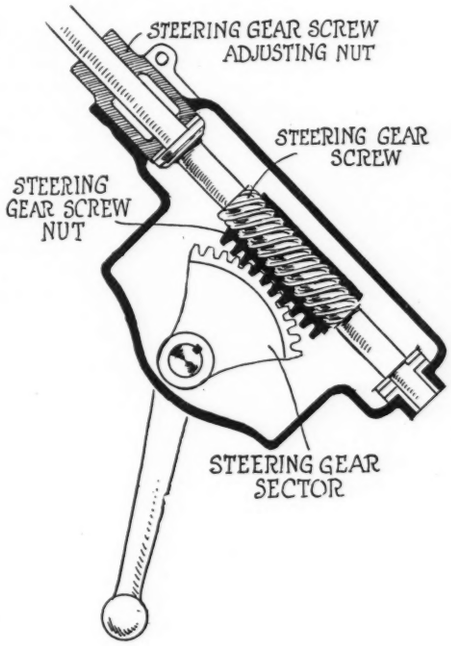
the best temperature. If it overheats, raise the front curtain of the radiator a trifle. If under-cooling is in evidence, cover the front of the radiator a little more. By thus watching the motor-meter and gaging the cover accordingly, you will be able to approximate very nearly summer running conditions.

The principal point in getting the carburetion system in shape is to provide plenty of heat to the incoming air. Another important factor is to provide some means for introducing gas to the cylinder on a cold morning so that the starting motor will not have to run for too long a time. The raw gasoline vapor is better for starting a cold engine than a mixture of gasoline and air. By priming the cylinders the gasoline is right on top of the piston close to the plug and does not have to be sucked through the intake manifold, where it might be condensed long before it ever gets to the top. With many of the modern carbureters, if they are properly adjusted, the engine will start on very cold days when the choker is applied. It is with the older types of instruments that difficulty in starting is experienced. Matters can be helped by fitting a priming device to allow gasoline to be introduced either directly into the tops of the cylinders or intake manifold. So far as possible it should be fed into the cylinders where it will get the first chance to explode. The illustration on page 8 shows a home-made device which makes priming possible without leaving the seat. This is to be used where the priming cups are located along the top of the engine. Means are provided for opening the cups simultaneously, and a shut-off at the dash regulates the feed of fuel.

Hot-Air Stove

A hot-air stove is an absolute necessity if the owner expects to get the best of Jack Frost. On some carbureters the hot air pipe terminates into a flattened end which fits up against the exhaust pipe, and while this arrangement works out all right in summer, it is wholly inadequate for winter. In such cases sheet metal stoves can be made to fit around the exhaust pipe, which will allow a greater volume of heated air to get to the carbureter.

Cars fitted with a vacuum gasoline feed should have the tank placed as close to the engine as possible. This serves to keep



Play in the steering gear can be taken up by the adjustment provided for it. Illustration shows adjustments on typical installations

the gasoline in the tank warm and goes a long way towards getting proper vaporization. If the tank at present is located at the front of the engine or off to one side, it may be prudent to install it closer to the engine for winter. The beauty of this is that when the car is left for any length of time after the engine has been run, the gasoline in the vacuum tank will be heated and can be kept so for a long period, especially if the radiator and hood are protected properly with covers.

Cleaning the sediment traps, etc., is necessary, so that the fuel will have a clear passage to the carbureter. This is important with a vacuum tank, and in the case of a Stewart tank the cleaning is done by removing the six-sided nut into which is screwed the connection for the main supply tank. A screen in the bottom of the opening collects all sediment from the main tank. Owing to the strong suction of the engine many particles of foreign matter are drawn into this trap and if allowed to accumulate eventually will shut off the supply.

If there is no priming device on the engine or choker on the carbureter, the best way to start is to stuff a rag soaked in gasoline in the air intake and then turn the engine over. If this does not help, the plugs can be taken out and gasoline squirted directly into the combustion chambers with a squirt can. A teakettle full of hot water poured over the intake manifold and carbureter helps, and this can be carried further by wrapping rags around the manifold to hold the heat. After this the engine can be turned over with the switch off to fill the cylinders, which in most cases will fire when the switch is closed. There are on the market various types of electrical heating devices intended to go between the carbureter and manifold. These generally consist of coils of fine wire which, owing to resistance to the electric current, become very hot. It is claimed that they assist vaporization of the initial charge materially.

To get the rest of the car in shape, we might as well begin with the top, for we shall be looking for its protection later on when the snow and sleet come. It must be made thoroughly waterproof, and one of the best ways to do this is to give it a good cleaning first, and then apply a coat of boiled linseed oil. This should be allowed to dry for a few days and then another coat applied. Mohair tops require a different treatment and for this one of the many dressings to be had should be used. Linseed oil will not do for them.

Clean Windshield

If the rear window is broken, it should be replaced by a new sheet of celluloid. The side curtains probably have been under the back seat for a long time, so they ought to be taken out and the wrinkles removed. Fit them in place on the car, and if any buttons or fasteners are missing fit new ones. There will come times when the side curtains will be of immense value, so they might as well be put in shape now. The windshield needs no special attention other than to give it a good cleaning and applying a thin coat of glycerin to it. This will prevent rain and snow from adhering to it. A windshield cleaner, of which there are several types on the market, will be a useful accessory for the winter.

It is now possible to get winter tops for nearly all of the popular open types of car bodies, and thus at the turn of a hand almost we have a closed car in which the passengers can be made as comfortable as in their homes, if the car has some form of heater. One of the chief objections to winter driving for many people is the intense cold. Obviously the occupants of a closed car have no way to stimulate circulation by exercising, and means must be provided for maintaining a habitable temperature therein. To meet this delemma there is a variety of heaters to be had, using heat from the exhaust, hot water from the radiator or electrically operated. There are others in the form of foot rests into which heated stones are introduced. They all serve their purpose, and even in an open car they make it possible for the passengers to keep their feet warm while at the same time enjoying being in the bracing air.

In closed cars it is desirable to have ventilators, not only for sanitary reasons but they will eliminate the hum often set up on the inside of the car by noisy gears. The body acts as a sort of sounding board, and the openings or ventilators will overcome this. If the openings around the foot pedals are very large they should be covered by nailing felt to the toe-board, cutting slots in the felt to fit around the pedal shaft. A lot of cold air gets in through the foot boards in many instances and these should be made hole-proof, because the forward movement of the car aggravates matters by forcing into the interior of the car more air.

Adjusting Brakes

The car above all things must be made safe for winter use. That is, skidding and side-slipping must be guarded against. Most cars are fitted with equalizers whose functions it is to make the pressure on each brake the same. If the brakes on one side of the car hold better than the other a skid is almost sure to be the result on a slippery pavement. On some cars without equalizers, adjustment is made by lengthening or shortening the brake rods by screwing off or on the yoke ends which connect to the brake arms. Care must be exercised to get the same adjustment on each. It can be tried out by jacking up the rear wheels and running the engine with high gear engaged. Have someone throw out the clutch and apply the brakes slowly while you watch the action of the rear wheels. If one of them slows up more quickly than the other, the adjustment on that side is tighter. Both wheels should be acted upon alike if the adjustments are correct. If the lining is worn, the brake bands must come out and new lining go in, for it would be little short of crime to venture into slushy roads and slippery streets with poor brake lining. Be sure your brakes are right.

The same is true of the steering gear. Excessive lost motion should be taken up by the adjusting collars and nuts located above the frame bracket. If the worm has worn to quite an extent, it can be removed from the end of the shaft and placed diametrically opposite to its original position. This necessitates cutting a new slot or keyway in the shaft. The idea in turning the worm around is that it presents a new bearing surface on the worm wheel, which is desirable.

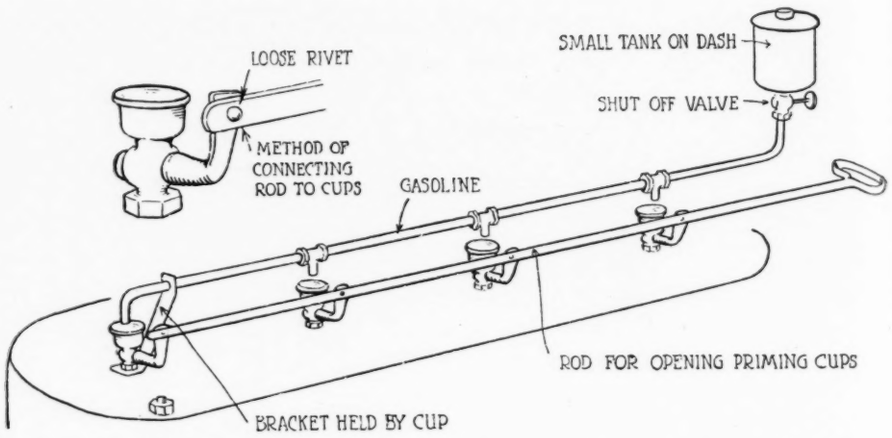
The next thing is to go after the tires. Winter is the worst season for changing tires on the road. Water is the chief offender, for it finds its way through neglected cuts in the tread, where it rots the fabric and eventually causes a blowout. Therefore, in the late fall the owner should examine them and fill all small cuts with rubber made for the purpose. Large cuts should be vulcanized.

The tube demands its share of inspection also. Watch the valve nut next to the rim and make sure it is drawn down tight. Clean the inside of the casing of all traces of lumpy soapstone or talc. Too much talc is worse than too little if there is danger of moisture getting into the tire, for the talc will cake and burn the tube. Mica used for this purpose is said not to cake if exposed to moisture and acts as a good lubricant for the tube.

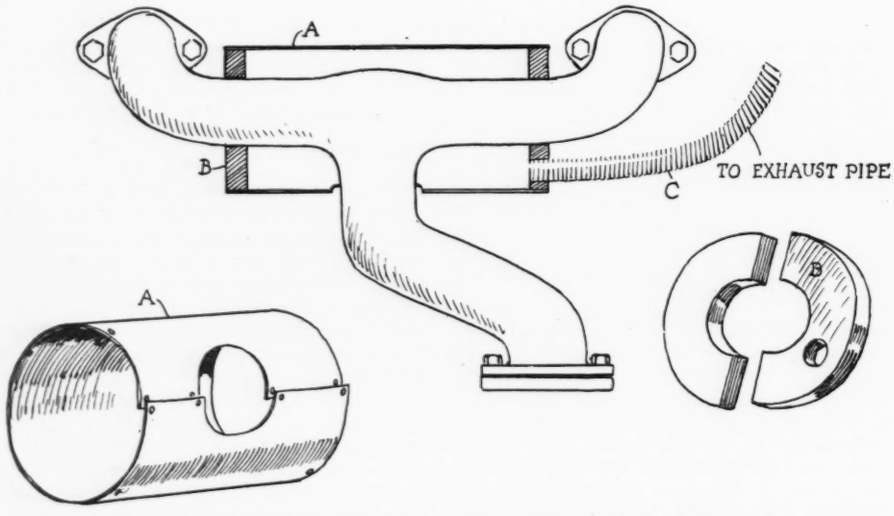
Do Not Overload

Overloading tires is to be avoided in winter the same as in summer, for it weakens the tire if continuously practiced. A casing is short-lived, too, if the rim on which it fits is rusty. The wet condition of the road in winter will cause rust to form rapidly on the rims, which has a disasterous effect on the tire just above the bead. A way out of this is to clean the rim thoroughly and apply a coat of graphite to it.

Watch the inflation pressure. It is just as important to keep the tires inflated to proper pressure in winter as in summer. A well-inflated tire drives easier and is not so susceptible to the rough ruts and ice of wintry streets. The spare tire is often the most neglected part of the car. Provide for it a good cover to keep out light and moisture. The tube in the spare should not be pumped up to the full pressure when in the carrier. Only enough air should be put in it to round it out. It is handy to put on a spare tire already pumped up to correct pressure, but it is equally provoking to find that such a tire might run only a few blocks before it blows out. Tires with non-skid treads are desirable in winter, especially if there is much snow on the ground. Where much driving is done on slippery pavements skid chains can be used advantageously, but they must not be applied too tightly to the tire. When the cross chains begin to wear rough, they should be replaced with new ones before damage is done to the casing.



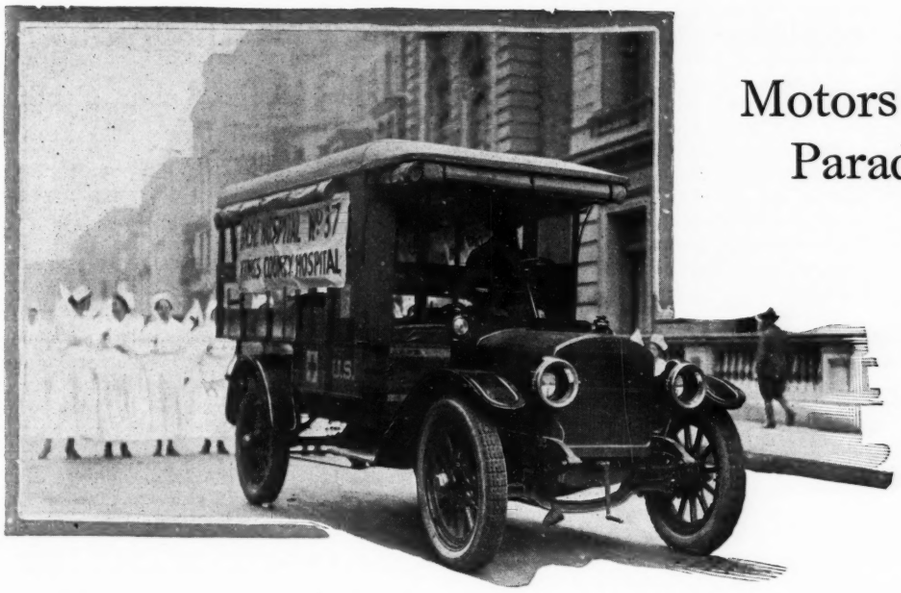
Home-made device for priming cylinders from seat. By pulling or pushing the rod, the cups are opened and the cylinders primed by turning on the fuel



Cut blocks of wood like B to fit around the intake manifold. Then make a steel shell A and fit it in place as shown with screws. Run a flexible tube C from a stove on the exhaust pipe to the heater as shown

Motors Feature Red Cross Parade in New York

Detail From Army Ambulance Section Shares in Cheering



G. M. C. standard Army ambulance, which carries four stretchers and eight sitting cases

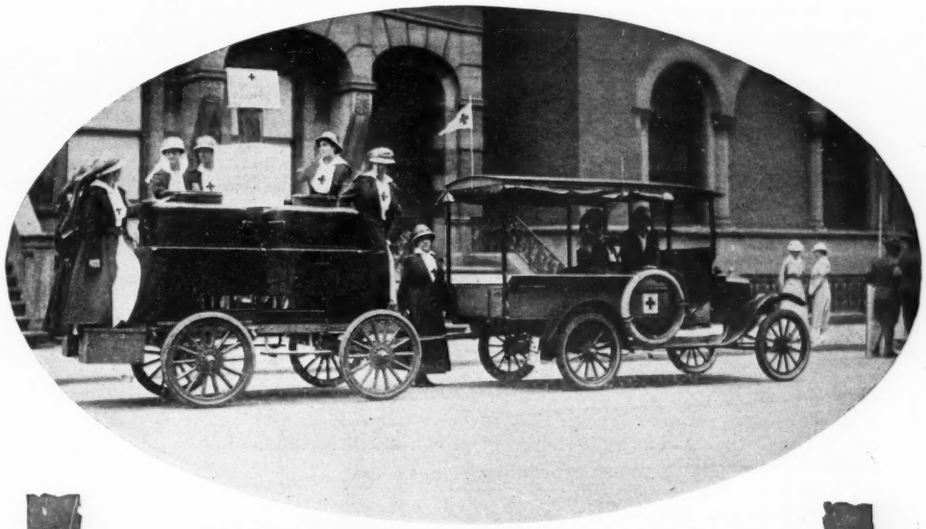
NEW YORK, Oct. 5—The most impressive women's parade New York has ever seen took place yesterday, when nearly 20,000 Red Cross nurses marched down Fifth avenue with the motor ambulances and canteen kitchens of their war service. The refreshment corps had a trailer with a field kitchen capable of supplying 100,000 cups of coffee. This is the outfit donated by the workers in the Department of Agriculture and consists of two large tanks mounted over a special heating apparatus that uses wood or coal as fuel.

Washington Corps

The motor ambulance drivers' organization of women of Washington, D. C., came to New York to take part in the parade. These women are doing active service around Washington now, though it is not known definitely whether they will be sent abroad or not. Mrs. J. Borden Harriman is at the head of the Washington organization.

A detail of 125 men in the United States army ambulance service made a practice march from Allentown, Pa., under the command of Major Francis Metcalfe, to participate in the march. The detail consisted of the band of the United States army ambulance service of fifty pieces, ambulance drivers and color guard. Twenty-two ambulances and three motor trucks were used to transport the men. The detail carried its own supplies and kitchen and was independent of outside assistance both during the trip and while in camp in the armory in New York. This band headed the second section of the auxiliaries of the Third Division, and the ambulance section, with kitchen trailer and trucks under command of Major Metcalfe, brought up the rear of the Third Division.

About 1000 nurses who have been given orders to be ready to go abroad marched in the parade. Sousa's band from the Great Lakes Naval Training Station near Chicago led with some 300 musicians. Motor ambulance and nurse shared in the crowd's plaudits. Grim, gray ambulances and kitchen trailers made effective breaks in the lines of the marching women, who did not break line until the end of a route from Sixtieth street to Washington Square.



Canteen kitchen that uses coal or wood as fuel

New standard Ford ambulance in Army ambulance section

Owner to Pay War Tax

Ultimate Consumer of Motor Car Is Left "Holding the Bag"

Canvass of Dealers Shows Diversity of Handling Levy

CHICAGO, Oct. 6—The ultimate consumer of motor cars and trucks is left "holding the bag" in paying the new 3 per cent tax levied against motor vehicles this week. The industry, almost as a unit, will pass the tax on to the consumer. This will be done in one of two weys:

1—By handling the item as freight has been handled in the past, or

2—By adding it to the list price and saying nothing about tax.

Dealers in the large distributing centers have been asked by MOTOR AGE how they intend to handle sales under the new taxation. Almost as a unit they declare they cannot absorb the levy themselves and that it will have to be passed along to the consumer, but there is some uncertainty yet as to the best method of doing this.

Some dealers say, and very rightly, too, that it is human nature to dislike taxation. They point out that if, for example, a car is advertised at $985, f.o.b. Detroit, and a prospective customer comes into a Chicago showroom and asks the price of the car, he is given no pleasant thrill when he is told with as much diplomacy as the salesman can muster that the price is $1,005. For that reason some dealers think the list price of the car, which includes the tax, should be advertised and mention be made of the fact that at that price it is tax free.

New Tax in Effect

Other dealers believe that mention of the tax in advertising acts as a deterrent to sales. Occasionally a dealer is found who says he will assume a portion of the tax himself. Sales made yesterday and the day before carried the new tax, and inasmuch as the tax is on a percentage basis dealers believe the levy will not affect sales, as one car is hit in proportion the same as another no matter what its price.

There is some diversity of opinion as to whether the list price of the car can be advertised as including the tax. Many dealers are awaiting instructions from the manufacturer and are reticent about their plans. The Chicago Automobile Trade Association legal department intreprets the new law as not applying to those cars which retailers had in stock prior to the law going into effect. How the Government will interpret this has not been announced.

The point has been developed by discussion of ways and means to meet the new war tax that if the exact amount of the tax is added to the list price of cars, it will be extremely easy for purchasers and the general public to figure out by simple mathematics just how much the car cost the distributer and the dealer. It is felt that it is not the public's business to know how much margin the dealer receives, any more than it is a public matter how much a piano dealer or a dry goods merchant, or any other tradesman makes on any transaction. To know the percentage of profit may lead to no end of trouble in the merchandising of cars.

For this reason Milwaukee dealers will divide all cars into price classifications, such as $750 to $1,000 or $2,000 to $3,000 and fix a standard additional charge to the consumer to cover the war tax, without letting the purchaser know exactly how much of a margin the dealer is receiving on the transaction, or for how much the manufacturer is selling his product to the distributor.

AUSTRALIA MODIFIES IMPORT BAN

New York, Oct. 5—Australia until further notice will permit import of cowl dashes with instrument board, foot board, mud guards, windshields and hoods on motor car chassis. This is a supplement to action taken by the Australian government Aug. 10 prohibiting the import of motor car bodies. According to this the American maker can ship the chassis equipped with these parts. Complete bodies cannot be shipped whether as part of the vehicle and mounted on a chassis or separate, except with the consent in writing of the Minister of State for trade in customs for the Australian government.

INCREASES IN PRICES

New York, Oct. 6—The following companies have increased their prices in the last two weeks:

CAR	OLD PRICE	NEW PRICE
Elgin	$ 985	$1,095
Empire 70A	1,285	1,345
Empire 71	1,285	1,345
F. R. P.	6,000	7,000
Jackson	1.395	1.495
Jordan	1,795	1,995
Lexington	1,510	1,585
Marmon	3,050	3,550
Monitor C. & R.	895	995
Monitor N. & O.	1,095	1,195
Olympian	845	965
Peerless	2,090	2,340
Reo R	875	985
Reo M	1,250	1,385

Kelly-Springfield will advance price of tires 10 per cent Oct. 15.

Eleven in Chicago Race

CHICAGO, Oct. 8—With the arrival of most of the cars entered for the Grand Prix Cup race scheduled for Saturday, Oct. 13, working tests have begun in earnest at the speedway. Starter Fred J. Wagner is here, supervising the installation of the timing apparatus which is expected to catch new marks for some if not all of the distances from ¼ to 100 miles.

Interest centers around the Frontenac trio, three aluminum-built mounts to be piloted by Ralph Mulford, Joe Boyer and Gaston Chevrolet. Gil Anderson's car, a Miller Special, comes in for its share of attention. Anderson had his car out for a trial spin and chalked up a mark of 104 m.p.h. The presence of Lewis, Milton, Henderson, Ford, Mason and Alley brings the list to ten drivers. The World Series is having a good effect on the advance sales of tickets. It is an ill wind that blows nobody good, and the overflow of disappointed sport lovers who could not see the Chicago games between the White Sox and the Giants makes a better advance sale.

A Roamer Special, from the Barley Motor Car Co., Kalamazoo, Mich., entered to-day. The driver has not been announced.

How Is the Industry?

Materials and Labor Continue to Cost More and Makers Increase Prices

Parts Companies Do 50 Per Cent Normal Business

DETROIT, Oct. 8—Small manufacturers of popular-priced cars continue to suffer from declining business. Makers with the best dealer organizations are doing the largest business. Those whose dealer organizations suffered most severely during the first days after the declaration of war have not recovered. Materials continue to increase in price and are difficult to obtain in some cases. Labor is at a premium and wages, which advanced 20 per cent in the last six months, appear to be headed for even larger increases. Practically all makers are increasing prices.

One group of car makers, including Ford, Overland, Buick, Maxwell, Chevrolet, Dodge, Oakland and Olds are enjoying record-breaking business. Each plans a winter production schedule in excess of 1916-1917 output. Each is visited by dealers beseeching shipments of cars. Yet, many dealers handling these cars, selling to farmers and to city trade, located in the East, Middle West and far West, complain of decreasing demand.

Several higher-priced car makers, including Cadillac and Hudson, have enjoyed exceptionally good business during the last few weeks and have apparently recovered completely from the slump that was noticeable during the summer months. High-priced inclosed cars, together with those of popular price, are in great demand and reported to be scarce in consequence.

Parts makers find themselves doing between 50 and 60 per cent of capacity business. They report the truck business in which the Government is placing orders has not progressed to the point where they are receiving considerable business through it, while in the main the passenger car business except for ten or twelve concerns has slumped to a degree that is not made up by the truck parts demand.

Almost all of the parts makers, however, anticipate a large, steady and substantial business on the class B truck for the Government, orders for which are being placed now. These contracts, it is expected, will more than care for the declining passenger car business, and are considerably more substantial and satisfying from the financial credit viewpoint.

Freight traffic conditions continue to tighten up though up to this time they have not interfered seriously with shipments. Many dealers within a 500-mile radius have commenced to visit the factories and make driveaways.

UNIONTOWN ENTERS 24 CARS

Uniontown, Pa., Oct. 8—Twenty-four cars already are entered in the Autumn classic race on the Uniontown speedway, Oct. 20, though but fifteen cars can participate on a course the size of Uniontown, 1⅛ mile, under the A. A. A. rules. A purse

of $35,000 will be distributed. The program is made up of three events. The main race will be 150 laps, the second a consolation in which cars eliminated from the classic are eligible, the third, a match race among N. P. (Red) Fetterman, in his Peerless, with the winners of the other two events.

The length of the championship match race will depend upon the desires of the two winners of the other races. Fetterman will start with a fresh car, but in case the other two drivers use the same car as the previous race, they may determine the distance. In case either of them starts with a new car, the distance will be 100 laps.

CAR	DRIVER
Hudson	Unnamed
Frontenac	Joe Boyer
Frontenac	Ralph Mulford
Pan-American	Tom Alley
Miller Special	Gil Anderson
Hudson	Ira Vail
Pugh Special	Jimmy Meyers
Duesenberg	Eddie Hearne
Crawford	Charles M. Ewan
Palc Special	Ora F. Haibe
Erb Special	Andy Burt
Hoskins Special	Dave Lewis
Hudson	Denny Hickey
Olsen	Harold Suckert
Olsen	Unnamed
Duesenberg	Tommy Milton
Duesenberg	Pete Henderson
Lawrence Special*	Unnamed
Haynes	N. P. Fetterman
Haynes	Bobbie Shoff
Hudson	Jack Conway
Frontenac	Gaston Chevrolet
Frontenac	Unnamed
Johnson Special	Unnamed

*Formerly Omar Special.

MERIDIAN PLANT NOT SOLD

Indianapolis, Ind., Oct. 5—The recent report in MOTOR AGE that the Olympian Motor Co., Pontiac, Mich., had bought out the Meridian Mfg. Co., Indianapolis, Ind., was an error, as the Meridian plant still is operating and manufacturing bodies. It is producing 19,000 bodies and is taking on new contracts. All the Olympian company purchased at this plant was stock to build 400 bodies.

PEERLESS PRODUCTION DOUBLES

Cleveland, Ohio, Oct. 8—The Peerless Motor Car Co. is reported to be earning at the rate of $200,000 monthly and has increased its production capacity 50 per cent. The progress of the passenger car business has been fair but necessarily curtailed by the huge demand for Peerless trucks for government work. It is reported the Peerless company soon will commence to manufacture airplane parts.

JAMES ALEXANDER DIES

New York, Oct. 5—James Alexander, treasurer of the Guaranty Securities Corp., died in this city recently. Mr. Alexander served as secretary from the inception of the business in Toledo. His successor has not been selected. The Guaranty Securities Corp. has been prominent in the financing of motor car time payment plan.

AUTO PARTS AUCTION ORDERED

Chicago, Oct. 7—Sale of the Auto Parts Co. of this city, by auction has been ordered by the courts. Plant, stock, equipment and good will are included in the sale, which is to be conducted by Samuel L. Winternitz & Co.

Smith Operation Changes

Creditors' Committee to Run Truck Corporation—Receiver for Tractor

Drop in Sales and Heavy Purchases Cited as Reason

CHICAGO, Oct. 8—Upon application of creditors having claims totaling $100,000, the Smith Form-a-Tractor Co. Saturday was placed in the hands of the Central Trust Co. as receiver. Yesterday also creditors of the Smith Motor Truck Corp., a distinct concern, manufacturing the Smith Form-A-Truck, agreed to withhold their claims against the Smith Motor Truck Corp. for at least six months.

The Smith Motor Truck Corp. is to be operated by a creditors' committee. Its assets, according to President D. W. Figgis, are $1,634,786 in excess of the liabilities, which amount to $1,700,000.

Holders of large claims against the two concerns believe that financial difficulties of both have been settled at least for the present. Seemingly these had reached a critical point as indicated by a suit filed against both companies in the Federal District Court by the Perfex Radiator Co. of Racine, the amount named being $12,500. The officials of the Form-A-Tractor company agreed to the receivership but insisted that the firm was solvent, with assets $35,000 in excess.

Heavy purchases of supplies and a sudden drop in sales are given as the reason for the troubles of both concerns. Operation of the Smith Motor Truck Corp. is to be by a committee of six, all creditors of the truck company.

George W. Houk

GEORGE W. HOUK, one of the pioneers of the wire wheel business in America, died in Los Angeles last week of pneumonia growing out of other illness. He was fifty-two years old. He is survived by a daughter, Mrs. F. H. Moody, whose husband is manager of the Houk business in California.

Mr. Houk was president and founder of the Houk Mfg. Co., and George W. Houk Co., its sales organization, and vice-president of the Wire Wheel Corp. of America, controlling the Houk interests. He spent his boyhood in Wellsboro, Pa., and in early life entered the bicycle trade. After several years in New York he went to London and spent fifteen years there in the bicycle and accessory business. He then returned to America and was with Packard and Oldsmobile in Boston, having the agency for the latter. About five years ago he brought the Rudge-Whitworth wire wheel to America from England and had it manufactured for him by the Standard Roller Bearing Co. of Philadelphia. Later he bought the McCue plant in Buffalo and operated it as the Houk Mfg. Co., making and selling wire wheels of his own manufacture. The business prospered, and to Houk is given much credit for the development of the wire wheel industry in America, having single-handed fought a long hard fight from the time he introduced the first wheel until his business reached its present proportions.

C. A. C. RUN IS CANCELED

Chicago, Oct. 6—The Chicago Automobile Club has canceled its annual event known as the master drivers' run to aid the Liberty Loan campaign. When the drivers and officials in charge of the run met at the club to make the final arrangements, enthusiasm for the second loan campaign caused a radical change. Instead of a three-day contest, which was to have been Oct. 11, 12 and 13, the cars of the master drivers and others of the club will be placed at the disposal of the Liberty Loan committee of Chicago, together with the services of the individuals. In addition all will help the salesmen wherever they can in tabulating and checking over their lists.

EDSEL FORD MUST SERVE

Detroit, Oct. 8—Edsel Ford, vice-president and secretary of the Ford Motor Co. and a partner of Henry Ford & Son, tractor manufacturers, was denied his claim for exemption from military service by the district draft board. Mr. Ford entered his claim on industrial grounds, contending that he now ranks next to and relieves his father, Henry Ford, in the actual administration of the motor car and tractor plants which now are turning out airplane parts, ambulances, tractors and trucks for Government service. Edsel Ford is married and has a baby, Henry Ford II. The district board notified him he would not have to appear for duty until the second call. Mr. Ford has not said whether he will appeal his claim to President Wilson or not.

HODGKINS BACK AT STUDEBAKER

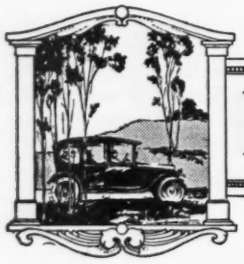
South Bend, Ind., Oct. 8—R. T. Hodgkins, general sales manager of the Studebaker Corp., has just returned to assume his duties following an absence of three months during which time Mr. Hodgkins served as a lieutenant in the navy. He was released from war duty because of the importance of his commercial duties.

RHODE TO WIRE WHEEL CORP.

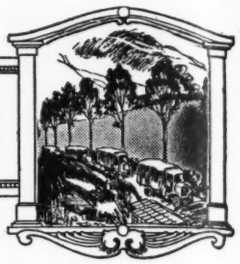
New York, Oct. 8—O. J. Rhode, formerly branch house service manager of the Splitdorf Electrical Co., has become service manager of the Wire Wheel Corp. of America with headquarters at New York. Rhode has been prominent in opening branch houses for the Splitdorf company in Europe and America.

REDDEN ENTERS TRACTOR FIELD

Chicago, Oct. 8—C. F. Redden, president and founder of the Redden Motor Truck Co., has sold his interests in the company and resigned to develop an organization which will market a popular-priced farm tractor.



EDITORIAL PERSPECTIVES



Is a Military Road Needed?

A MILITARY motor truck test between the Quartermaster's depot at Atlanta, Ga., and the supply depot at Fort Oglethorpe, scheduled to take place this week has had to be postponed for thirty days on account of damage done to the Dixie highway by a ten-day rain. So great was the damage that Camp Gordon near Atlanta has been almost isolated. The mere fact that one of the National Army cantonments is isolated is worth attention. Such a condition is deplorable.

SUCH an occurence should be an eye-opener to the need of military permanent roads. Just assume this occurred at some period when there was a real military necessity of carrying supplies from Atlanta to Fort Oglethorpe by truck, or that it were actually necessary that the soldiers at Camp Gordon be moved in a short space of time. The enemy hardly could be expected to wait thirty days until the roads dried up and damage repaired.

Wanted—Good Mechanics

JUST at this time, when many of the men best qualified to make intelligent repairs on cars are going into the service, either through enlistment or the draft, one of the chief sources of expense to the motorist becomes more pronounced. This is the need of mechanics who can be relied upon to give efficient and intelligent service to the owner. Motorists do not begrudge Uncle Sam the services of those men who can be valuable to him in carrying on the war. Perhaps the fact that many of the best mechanics are being taken away from the garages and repair shops may bring about some relief from a situation which has been bad previously, and only is made a little worse by the present condition.

MOTORISTS as a whole are somewhat to blame for the fact that many men have posed successfully for a time as mechanics who were little, or no more, capable of intelligently doing the work than the motorists themselves. The only advantage some of these so-called mechanics have is the fact that they have access to tools and equipment which are not available to the owner. Many of us calmly intrust the delicate mechanism of our cars to any one who may claim to be able to do the required work while we would not permit any but a skilled watch repairman to tinker with a timepiece which represents an investment of less than one-twentieth as much.

THE trouble is not alone one which applies to the owner. The garageman and dealer also face this trouble, and perhaps realize it more thoroughly than do the owners. Some of them are free to admit that reliable mechanics are hard to get, and that they do not always succeed in getting and keeping them. Before a man is permitted to cut your hair, work on your teeth or treat you for any illness, he must have a certificate which attests the fact that he has proved himself proficient. Would it be too much to ask that the man who operates on the vitals of your car likewise should present some guarantee that he knows what he is doing?

Through Routes a Saving

IT is fortunate that recent efforts in road building have been directed toward completion of connected state and inter-state roads. A concrete example of what uncompleted and disconnected inter-state roads are costing the nation at the present time is the recent experience of a motor car dealer in Georgia, who has had to charge up a loss of $5,000 to the account of bad roads between Nashville, Tenn., and his city. Had the Dixie highway between Nashville and Chattanooga and a short stretch of the highway between Chattanooga and Atlanta been rebuilt, his transaction would have shown a profit instead of a loss.

UNABLE to get the freight cars for deliveries from Detroit and with prospects of cancellations for failure to deliver, the dealer sent forty drivers to Detroit to bring as many cars over the Dixie highway to his Georgia city. Owing to the fact that the new Dixie highway between Nashville and Chattanooga under construction was not open for travel, mountain detours were necessary such that the expense of the drive and damage to the cars showed him a net loss on delivery of $100 per car.

IN the light of his experience, it is doubtful if other dealers in the South will attempt to experiment, and with the railroads tied up as they are now with Government work, deliveries by freight may be impossible, so that some southern dealers may have virtually to suspend business. If empty passenger cars cannot make the trip through the country, passenger and freight carrying trucks will be unable to make the trip, making still more serious the shortage of railroad equipment.

Farm Tractor Service

IT is pretty well decided now that the farm tractor used for plowing and for all forms of farm cultivation, as well as what is known as belt work or driving farm machinery like ensilage cutters, etc., will not have to do much road work. The farmer now is becoming so motorized that in addition to his motor car and his farm tractor he already is adding a light motor truck or adapted Ford or other car. This indicates that the tractor will not have much of a field on road work and that designers can set their faces to the task of developing a machine well qualified to meet all farm cultivation requirements.

FARM tractor development is adapting itself very quickly to varying farm needs. The farmer generally has been in the habit of buying special machines for special jobs, and it is in line with a policy he has been following to purchase perhaps two, three or four different types of motorized farm apparatus. As it looks to-day he has his motor car, he is buying his motor truck, he is buying his farm tractor for plowing; he soon will be buying his farm tractor for cultivating purposes, and it may be he will add some other type of general utility tractor which will round out his equipment and bring into full reality power farming.

Fight or Furnish War Funds

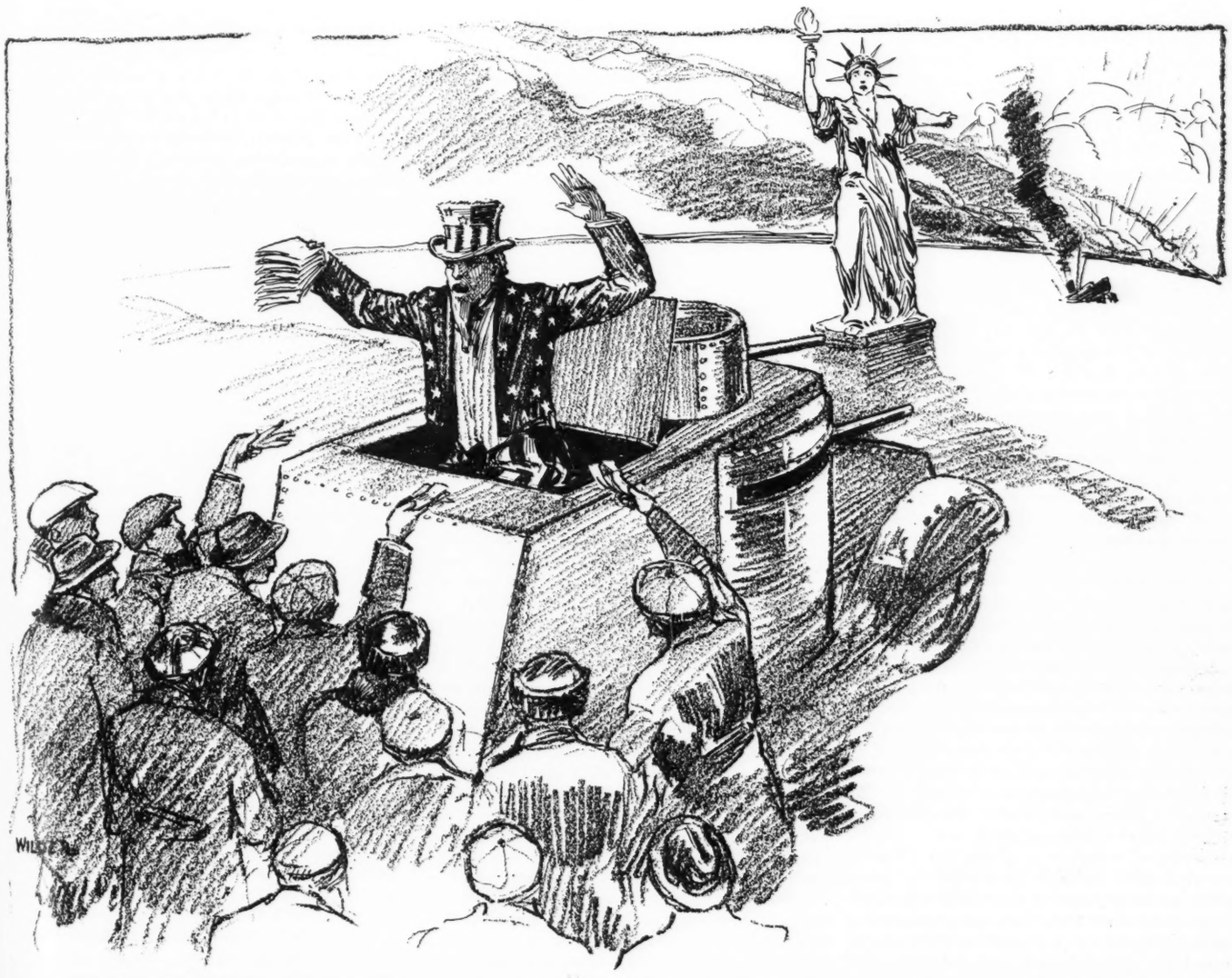
THE thing that is underneath every war, and without which war can not progress, without which national security can not be achieved, without which the wheels of government stop, without which busniess and all the affairs of American life could not live, is money. It is of paramount, primary, elemental importance in time of war. If one single loan offered to the American people should fail it would be a more fateful disaster than the loss of a great battle.—William G. McAdoo, Secretary of the Treasury.

WHAT YOU CAN DO

WHAT is the least you can do for our boys at the front? The least you can do for them is to give them the means of defending themselves so that when they meet a German soldier in the deadly grapple of war, when the battle is raging and life is hanging in the balance, every brave boy at that front will know that in his hands, put there by American love and American skill, is a weapon, the best that can be devised, that will give him a possible superiority over his foe so that he may strike sufficiently well to save his own life and be able to strike again for America and for liberty. You want him to know, too, that the line of communication between him and home will be protected. It is 3,000 miles wide, imperiled by the deadly submarine and the tempests and storms of the waters. We must be just as willing to sacrifice all our money for our boys as we know they are willing to sacrifice their lives for us and our safety.

WHAT GOVERNMENT OFFERS

AND what does the government offer? A superlatively safe and desirable investment, the greatest ever offered to any people. There is nothing so good as a government bond; there is nothing so near cash as a government bond; there is nothing the principal of which is so absolutely safe as a government bond; there is nothing which is so available as collateral in a bank, as a government bond; and there is nothing upon which your interest will be paid so certainly as upon a government bond. And while you are buying that bond which is the best investment in the world for yourselves, you are helping this splendid cause, you are helping every soldier and sailor who wears the uniform of his country, and you are helping moreover to keep the flag of America, the Stars and Stripes, in the skies. Never shall it be trailed in the dust while there is a drop of blood in the veins of an American freeman! Buy a Liberty Bond!



Uncle Sam, the auctioneer: Come on, you boys! Buy Liberty Bonds! Put up your money. Remember you get it back with 4 per cent. Come on now! Make it quick and snappy! Liberty is calling. If you are too old to dance, help pay the fiddler!

U. S. Standard Truck Ready

Rapid Assembly of Type B Q. M.

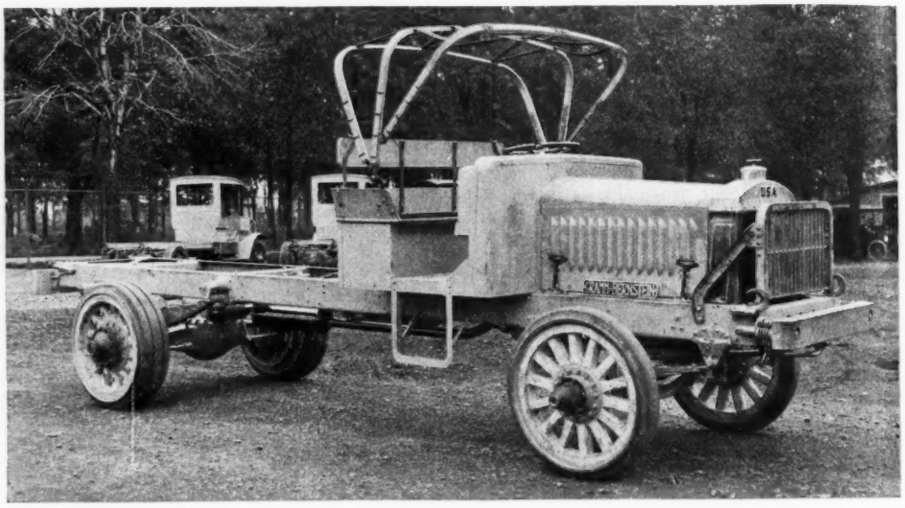
Model Beats Record of Liberty Motor

WASHINGTON, Oct. 9—Special telegram—The first heavy-duty standard war truck for the Quartermaster's department, popularly known as the "Liberty truck," has been assembled and was started running at the Gramm-Bernstein factory at Lima yesterday. Another one was assembled at the Selden factory in Rochester, N. Y., and was started on the road today.

Both are the type B trucks designed for a 3-ton load, but with capacity for 5 tons.

Assembly of the trucks as well as the designing sets a new record in American production. The first truck, according to schedule, had to be ready for the road Oct. 10. It came through two days ahead of schedule. In less than twenty days after the designs had left Washington, all parts had been cast and machined and the truck completed ready for tests.

The two trucks assembled as experimental ones have exceeded the expectations of General Chauncy B. Baker, of the Quartermaster's department, which has directed the work and also the expectations of the two-score engineers who have worked on the designs since the first of August. Early motor tests showed 58 hp. at 1350 r.p.m.



First U. S. standard type B truck for Q. M. department, produced in twenty days

May Revolutionize Design

It is now assured that the truck is one of the biggest engineering successes of the war, and that it is destined to revolutionize army truck work and will play a big part in revolutionizing commercial truck design.

That the War Department, as well as the engineers who worked on the job at the request of the Quartermaster and as members of the Society of Automotive Engineers are convinced that it is right is shown by the fact that already orders for parts for 10,000 trucks have been placed. These orders have been widely placed over the industry, generally three or more concerns receiving orders for each of the parts. When plans mature it is expected that orders for many additional trucks will be placed.

Criticisms as to the truck being too heavy for its carrying capacity have been largely dissipated by official weights given out by these concerns building the units entering into the first machines. Gramm-Bernstein, who assembled the first truck, states that the total weight of the chassis without body is 8,600 lbs, which, with a 1,600-lb body, will bring the total up to 10,000 lbs. This is very little heavier than some of the best 5-ton trucks now on the market. There are several places where weight can be reduced with ease. A few examples of weights as given out by makers that have produced some of the parts gives an indication of how well the engineers have done their job notwithstanding their being under orders to build a stout, robust job suited to the extreme service of the war zone. The motor weight, 1,012 lbs., is scarcely more than 100 lbs. above the weight of engines for similar commercial trucks. The rear axle weighs 1,592 lbs.; front axle, 352 lbs.; gearbox and gears, 233 lbs.; clutch and case, 103 lbs.; frame, 653 lbs.; front springs, 148 lbs.; rear springs, 544 lbs, and the body 1,600 lbs.

Now that the war truck, as it has been christened, is a reality, the herculean work of the forty or more engineers who handled the job stands out in strong relief. The work of speedy co-operation that characterized the Liberty aviation engine not only has been duplicated but improved upon in the war truck. With the war truck the work was harder to accomplish, and so the credit is correspondingly greater.

Rather than the work of any one individual, the engineer best qualified for a certain job handled that in consultation with his fellow engineers. Considering this great amount of conference work it is amazing that the truck has come through so rapidly. In short, it was not believed by many a month ago that the job could be done. The impossible has been made possible, and a new chapter in war co-operation has been written.

Continental, which was one of the several engine concerns to work on the engine, got its blue prints Oct. 9 and the engine was running in nineteen days and 18 hr.

Waukesha made a still better record, getting its first engine running in eleven days 7½ hr. from the time the blue prints reached its factory. These companies did not have to make the patterns for casting or the dies for forgings, these having been previously made, but they had to do all the machining and other operations on the parts.

In developing the engines, four or five engine makers co-operated by dividing the different parts among them and one concern making several parts not only for itself but for the other engine makers. In this way, time was economized. Thus Continental made the cylinders, gearcase cover and many small parts such as pumps, bushings, etc.; Waukesha manufactured the cylinder heads, crankcase, intake and exhaust manifolds, roller push rods, etc.; Wisconsin made the lower part of the crankcase. So was the work farmed out.

The engine in reality is a composite design, not involving anything radical, but rather a combination of the best engineering knowledge of the country; thus in summarizing the operation talent embodied in it, it might be said that the crankcase is Continental, the cylinders Waukesha, the oiling system Wisconsin, the pistons Hercules and the timing gear system a combination of Buda, Wisconsin and Continental. The governor is a combination of Kelly-Springfield and Waukesha while the camshaft is a composite design.

The engine has been designed with the thought in mind of the use of heavier fuels, including kerosene and is such that heavier fuels will only call for an extension of the manifold system.

What has been said of the engine can be said of the transmission, the axles, and many chassis parts. Three or four of the leading axle makers have worked together on the axle designs. So with the transmission. So well have all of these concerns co-operated that the schedule set for the completions of the different truck units as well as the completed truck has been lived up to and generally improved upon. The first engines bought in different factories were to have been delivered on Sept. 20 and they were delivered on that date; the completed chassis was to have been ready Oct. 10 but it was ready on Oct. 7.

BOSTON CLOSED CAR SHOW

Boston, Mass., Oct. 6—Boston inaugurated a closed car show week this evening, and it will continue through the next week. As next Friday, Columbus Day, is a holi-

day it is expected to be the big day of the week, for many out-of-town motorists and dealers will come here for the show. The salesrooms are being kept open from 10 in the morning until 10 at night, and many of them have special decorations inside featuring their closed models. The buildings are decorated outside, even the truck and tire firms sharing in this work. Many places are illuminated at night outside making the buildings very attractive.

The show is being held in the individual salesrooms instead of in one building, and the work is being directed by committees of the Boston Automobile Dealers' Association.

TO FIX GAS PRICES

Washington, D. C., Oct. 9—Special telegram—The fixing of prices by the Government of oil and gasoline is close at hand now that the Federal Trade Commission practically has completed its estimates of the cost of production. A preliminary estimate already has been agreed upon. Petroleum Administrator Joseph F. Guffey will fix the prices. Price fixing alone, not Government supervision directly is expected now for oil and gasoline.

SIMPLEX TRACTOR USES KEROSENE

Wichita, Kan., Oct. 5—The tractor to be made by the Simplex Tractor Co. will burn kerosene and use one lever for control, which will have two forward speeds and one reverse. The company has been incorporated with a capital of $300,000 and will erect a plant to build 1000 farm tractors a year. Many orders from foreign markets have been received. Incorporators include James P. Sullivan, O. D. Barnes, R. C. Fisher, W. Magill, C. Franks, F. O. Stone, I. N. Williams, Henry Bockelman and A. E. Alport.

INDEPENDENT OIL MEN MEET

Chicago, Oct. 9—Members of the Independent Oil Men's Association have began a four-day convention at the Hotel La Salle to-day, during which there will be a thorough discussion of oil production and kindred matters. The meetings will be closed to all except members of the Association, and among the more prominent papers to be presented are: "Development of the Oil Industry," by H. L. Doherty, New York; "The Oil Industry and the War," R. L. Welsh, Kansas City; "Is It Likely Petroleum Deposits Will Become Extinct?" by J. A. Halderman, Chicago; and "New Phases of the Oil Industry," by Dr. David T. Day. During the convention, the sixtieth anniversary of the discovery of the first great American oil field, in Tarentum, Pa., is to be celebrated.

AVIATION TRUCKS TWO SIZES

Washington, Oct. 5—The motor trucks that the Signal Corps uses will be quite different from the standard army war trucks. There will be two sizes, the light truck specifications which follow being complete. This truck will have a Continental C-a engine with a Monarch governor, disk clutch, Brown-Lipe and G. M. C. selective gearset, worm drive, semi-elliptic springs, wood wheels shod with pneumatic tires, 35 by 5 in front and 28 by 7 in rear. The price of the chassis is to be $2,040.72.

Oil Short of Vessels

Mexico Officially Denies German Influence on Handling of Fuel Shipments

Two Million Tons of Petroleum in June and July

CHICAGO, Oct. 8—Though the main thing the average motorist can do nowadays is look to his own gasoline and adjustments so that economy of fuel may be observed, the increases in production in the oil field are indicative of the doubled increase that may come with his economy. Anything tending to show a probability of more gasoline is of moment at this time. Just now perhaps no one feature of the oil trade is any more important than the situation in Mexico, as reported by the Mexican government in refutation of German influence on oil movements.

The Mexican government, making official denial of German influence in connection with the handling of oil from Mexico, says the only limit to exportations of oil is the availability of vessels for transportation; that 99 per cent of the production and shipment are under American and British control solely; that there are now in storage many millions of barrels awaiting shipment; and that Americans and English are shipping all they can handle, having in reserve immense stocks, while their potential and immediately available production is incalculable.

One of the larger wells brought in in Mexico, it is asserted, has a potential capacity of more than 150,000 bbl. daily, being the largest in the world, and the property of an American company. With others, such as those of the Aguila company, this well is shut down for lack of ocean transportation. The lack of facilities for the exportation of the potential production of its oil fields constitutes a serious loss for the Mexican government, it is pointed out, in the great value of the imposts which would be collected otherwise.

The Secretary of the Treasury of Mexico announces that the exportations of petroleum for the months of August and September, the complete returns from which are not yet in, will exceed those for June and July, which amounted to upward of 2,000,000 tons. Complete returns for August and September are expected to approximate 3,000,000 tons.

The high price of crude oil is beginning to have its effect in the increased number of rigs in the fields and wells drilling at the end of September, the largest number ever reported. This is in spite of high cost and difficulty in obtaining oil well supplies and the shortage of water. The total initial production in the country showed a decrease due solely to the fuel oil districts of Texas. In all 2040 wells were completed, an increase of 199, and the initial production was 145,152 bbl.

During June and July Mexico exported approximately 2,000,000 tons of petroleum. Owing to recently increased movements there it is estimated petroleum exports from Mexico for August and September were about 3,000,000 tons.

Save the Gasoline!

Suggestions Made by the N. A. C. C.

1—Do not use gasoline for washing or cleaning—use kerosene to cut the grease.

2—Do not spill gasoline or let drip when filling—it is dangerous and wasteful.

3—Do not expose gasoline to air—it evaporates rapidly and is dangerous.

4—Do not allow engine to run when car is standing. Cars are fitted with self-starters and it is good for the battery to be used frequently.

5—Have carbureters adjusted to leanest mixture possible—a lean mixture avoids carbon deposits.

6—See that piston rings fit tightly and cylinders hold compression well. Leakage of compression causes loss.

7—Stop all gasoline leakage. Form the habit of shutting off gasoline at the tank or feed pipe.

8—See that all bearings run freely and are well lubricated—friction consumes power and wastes gas.

9—Protect the radiator in cold weather—a cold engine is hard to start and is short in power.

10—Keep the tires fully inflated—soft tires consume power.

11—Do not drive at excessive speed. Power consumption increases at a faster rate than speed. Every car has a definite speed at which it operates with a maximum fuel economy.

12—Change gears rather than climb hills with wide open throttle—it saves car and gas.

13—Do not use cars needlessly or aimlessly. By exercise of forethought a number of errands can be combined so that one trip to town or elsewhere will do as well as two.

14—Reduce the amount of riding for mere pleasure by shortening such trips or cutting down their frequency.

LANE AT WICHITA SHOW

Wichita, Kan., Oct. 5—Secretary of the Interior Franklin K. Lane was the guest of honor the opening night of the motor show held with the International Wheat Show and Food Conservation Congress here this week. The exhibition is being held in a building that provides 20,000 sq. ft. of floor space and is under the auspices of the Dealers and Accessory Association of Wichita. Thirty-one dealers have space, and 103 cars, representing sixty-three makes, together with seven truck and four accessory exhibits are shown. The building is near the main entrance to the fair. Everyone entering the fair must pass through the building, thus giving the dealers a decided advantage. The attendance the first day was 5300.

ROSS AN EIGHT ONLY

Detroit, Oct. 6—Contrary to a report that the company would make a six-cylinder car, the Ross Automobile Co. expects to continue the manufacture only of its eight-cylinder model, which is fitted with a Herschell-Spillman engine, according to H. D. W. Mackaye, general manager.

Overland to Rival Ford

Toledo Maker Reveals Brand New Car to Sell at Less Than $500

Enormous Quantities Scheduled in Plans of Big Output

TOLEDO, Ohio, Oct. 5—John N. Willys will be a rival of Henry Ford in the manufacture of a car under $500. The announcement that the new Overland car which is to rival the Ford has been completed, tested and settled in every detail comes as the expected and long looked for in the cheap car field. For several years the Willys-Overland Co. has been working on this car, and plans already are matured for building it in enormous quantities, apparently to out-produce Ford. While the price is not stated, it will sell for less than $500 and carry complete equipment, including electric starting and lighting with combined dimmer control. In its complete equipment form, including starting battery, lighting system, extra tire and tire carrier, the weight is 1500 lb. The tires are the same size as those on Fords.

A Different Body

The body is somewhat different from other Overland types, due largely to the system of springs which gives a distinctive appearance to the front and rear, and while the wheelbase is 100 in. it is claimed this system of spring suspension gives the effect of a wheelbase much longer. The radiator is standard Overland though slightly smaller. The body is streamline with removable upholstery.

The engine is 3½ by 4 in. and reaches the peak of its power curve at 2000 r.p.m. Though it is 13 per cent smaller than the Ford engine it is said to produce 52 per cent more power, since the Ford engine peaks at 1200. The transmission is a two-speed sliding gear, and a conventional clutch is used. An entirely original frame is used, and the cross members are supplied by the running board supports, which are stiffened by the steel battery box that lies just inside the frame under the front seat.

The gasoline tank hangs under the cowl on three-point suspension. All the control is centralized on the middle of the dash and consists of ignition switch, lamp dimmer and throttle setting for idling, together with the choke. Front and rear axles are somewhat similar to those of the Ford, but the latter has ball bearings. The fenders are crowned, the front ones being pressed in such shape as to combine with the hood ledge. The fore doors are exceptionally wide, and there are a 16-in. steering wheel and a slanting windshield. A one-man top completes the equipment.

IT'S BRIG. GEN. BAKER NOW

Washington, Oct. 6—It is now Brigadier General Chauncey B. Baker, Quartermaster Corps, United States Army, the Senate having confirmed the nomination. General Baker represents that element in the army which wins recognition by sheer ability and force of character, and his promotion will be of unusual interest to manufacturing and transportation circles as a result of the excellent work he has done, since war with Germany was declared, as chief of the transportation division of the army.

In this connection General Baker has had supervision of the purchase of all motor equipment for the army, and he has been especially active in the standardization of the military motor truck. In everything having to do with the designing of the engine for this truck and the standardization of parts, General Baker has been at the head, this bringing him into close relationship with the automotive industries of the country.

HOOD STILL HEADS BUREAU

Detroit, Oct. 8—Wallace C. Hood, president of the Hood Service Bureau, who has become sales manager of the King Motor Car Co., will continue as president of the Service Bureau and will retain his stock but will leave the managership to Frank M. Eldrege, the secretary and treasurer, who has been appointed general manager.

TO SELL DREXEL AT AUCTION

Chicago, Oct. 6—The entire plant of the Drexel Motor Car Corp. will be sold at public auction by order of the United States District Court, Oct. 24-25. The bankrupt inventory value is more than $400,000. The plant is fully equipped for making cars and includes a stock of parts and supplies, motoms, bodies, etc., worth more than $200,000, according to the inventory. Harry B. Staver is trustee.

Giant Carbon Merger

CLEVELAND, Ohio, Oct. 5—The merger of the Prest-O-Lite Co., National Carbon Co., Union Carbide Co. and the Linde Air Products Co. into a corporation with 3,000,000 shares of no par value stock is nearing completion. Holders of National Carbon stock are offered one share of stock of the new company, which will be known as the Union Carbide & Carbon Corp., for one share of National Carbon stock. Figured on the current price of Carbon stock, the new concern's capitalization would be $228,000,000 at market figures.

The new corporation will have plants in all parts of the country and will co-operate closely with the Government during the war. Its products include motor car appliances, electric batteries, acetylene blow torches, lighting carbons and acetylene gas. The combination also will absorb the Oxweld-Acetylene Co., which virtually is controlled by the Union Carbide Co. It is rumored the giant concern follows suggestions by the Government, though nothing has been stated definitely as to whether this is so or not.

Officers will be: President, George O. Knapp; vice-presidents, Edgar F. Price, M. J. Carney, J. S. Crider and Giles W. Mead, who will be also treasurer; and secretary, H. E. Hackenberg. Myron T. Herrick will be chairman of the board of directors, which will include Andrew Squire, James Parmalee, C. K. G. Billings, Charles A. Coffin, J. J. Ricks, Nicholas F. Brady, G. W. Davidson, Conrad Hubert, Roger C. Sullivan, F. C. Wolcott and James N. Wallace.

20,000 Planes on Way

Secretary of War Baker Promises Men to Man Huge Air Fleet

American Aviators Train in Camps of Allied Nations

WASHINGTON, Oct. 8—Practically the total number of 20,000 airplanes for the United States army provided for in the $640,000,000 aviation bill passed by Congress in July is now under construction, contracts having been let and work started on both planes and engines. The types of planes now being manufactured, in which the Liberty motors will be installed, include the entire range of training machines, light high-speed fighting machines and powerful battle and bombing planes of the heaviest design.

This statement is authorized by Secretary of War Baker, who says the giant battleplanes contracted for are capable of the work of the Italian Caproni, the British Handley Page and similar types. The Secretary added:

"Every measure of insurance has been taken that the American forces in France shall be amply equipped with aircraft. The comprehensive plan is that when motors are ready there shall be ready also the planes necessary; and, when the motors and planes are ready, aviators and machine guns shall be available.

"The work of the Aviation Section has been thoroughly systematized. The training of aviators, the building of motors and the construction of wings is proceeding uniformly, each keeping pace with the other and with general war plans."

Entitled to Information

Secretary Baker expressed the view that the country was entitled to some information as to the progress of the aircraft building program and that, while it was inexpedient to impart information of military value, or to detail strategic plans, it was felt that a partial announcement should be made of the work being done.

Continuing along this line, Secretary Baker authorized the following statement:

Within a reasonable time, considering the period for preparation, this country will send its first airplane to Europe. This airplane, from the tip of its propellers to the engine, machine gun and camera, will have been made in the United States.

It has been necessary greatly to develop and expand the aircraft industry in this country. This work of increasing the output of existing manufacturing establishments, creating new plants and providing tool, gage and jig equipment for great quantity production has required time, and the months of the summer have been, and the early fall will be, devoted to this essential groundwork.

United States airplanes are being constructed both in this country and abroad. Approximately a fourth of the number soon needed will be made abroad.

Provision has been made also for the manufacture of the many accessories necessary to aircraft service at the front. Sources of supply for machine guns, observation apparatus, cameras, scientific instruments of navigation and precision, and many other specialties of the aircraft art have been provided.

The designing of the Liberty motor has been accorded foreign recognition. Our allies already have asked for samples of these motors and are investigating the possibilities of quantity production in this country.

The United States today is in practical control of many of the materials required for the manufacture of aircraft both for this govern-

ment and its allies. Steps have been taken for the conservation and distribution of such materials and the great resources of this country.

Under the direction of the Aircraft Production Board an international standardization in the tests of materials and their specifications is being made, so that through a unification of the demands upon this country there may be full utility of our resources.

More than thirty of the air service experts of the allied nations have come to Washington and are on regular duty with the officers of the army and navy air services and with the members of the Aircraft Production Board. The best men of the air services of the allied countries have been loaned to this government and were sent here to aid in getting our aviation program under way with the fewest possible mistakes and the greatest economy in time.

American aviators are today in training in all the allied countries. They are undergoing intensive training behind several of the battle fronts. The sending of great numbers of American aviators abroad and the rapidity of training preparations at the flying schools in the United States—such as the one near Dayton—indicate the scope of the work of the aviation section since funds were made available for an army of aviators.

One of the interesting developments in activities in the production of the new U. S. airplane is a little stucco building on a knoll at the Bureau of Standards grounds in which a vacuum chamber is testing airplane engines at atmospheric conditions ranging from that found at sea level to that found at an altitude of 20,000 or more feet.

No steps have yet been taken toward the reorganization of the Aircraft Production Board under the law just passed, and under which a change in membership will be necessary. It was stated at the offices of the Aircraft Production Board that nothing was yet ready to be given out.

It is expected that the Wright-Martin Aircraft Co. will start to pay dividends on its $5,000,000 preferred stock before the middle of next year. The company has almost completed its French contracts on which the loss is estimated at $400,000. The contract with the United States government, however, is expected to show a substantial profit, larger than the loss on the French contracts. The company has $2,000,000 in cash, owes no money, and its plant and equipment of $5,000,000 are paid for. The reason for expecting a dividend is that within the next six months the company will receive about $2,500,000 for payments of Wright patents and for the profits on government work.

Goethals Heads Wright-Martin

Major General George W. Goethals, builder of the Panama canal, has been elected president of Wright-Martin. The directors have authorized him to go ahead on the enormous building program at its plants. General Goethals will give his entire time to the work.

The Government has leased the Wright field at North Dayton, Ohio, for a temporary central engineering and experimental field. The site was selected on account of its location and its proximity to the Wilbur Wright field. It will be known as McCook field. Offices, machine shops, hangars and barracks will be built immediately.

James H. Stelling, of the Arnold Stelling Co., Inc., distributer of Simplex cars, has secured an airplane factory in Oakland, which has a capacity for three planes per week. Arrangements are being made to secure Government work. The plant is known as the Christoffersen and was built in 1912 by Silas Christoffersen, who was killed last November.

Contracts have been let by the Aircraft Production Board with the General Vehicle Co., Long Island City, N. Y.; the Buick Motor Co., Flint, Mich., and the Westinghouse Air-Brake Co. of Pittsburgh, Pa., for the manufacture of the 80-hp. LeRhone and the 110-hp. Gnome aircraft engines.

U. P. C. Buys Building

ONE of the largest real estate deals ever recorded in connection with the trade paper publishing business has just taken place. The United Publishers' Corp., 239 West Thirty-ninth street, New York, publisher of some twenty or more leading trade and technical papers, including MOTOR AGE, *the Automobile and Automotive Industries, Motor World, the Commercial Vehicle, The Iron Age, Dry Goods Economist, American Architect,* etc., has purchased the building largely occupied by it, and commonly known as the McGraw building at 239-243 West Thirty-ninth street. This is an eleven-story and basement loft building, measuring 194 ft. front by 90 ft. deep and entirely occupied by publishing interests. This purchase was consummated through the acquisition by the United Publishers' Corp. of a majority of the stock ownership of the building. The deal was based on a valuation of the property of more than $1,300,000.

The building is located ideally, within easy access to both the New York Central and Pennsylvania Terminals, and only three blocks from Times Square. The first floor is occupied by the Times Square Station of the New York postoffice; three floors and basement are occupied by the Federal Printing Co., which is the printing department of the United Publishers' Corp.; the four other floors are occupied by the publishing offices of the United Publishers' Corp. itself. This purchase guarantees to this publishing business a permanent home under ideal conditions and surroundings.

MAKERS TO MAKE ORDNANCE

Detroit, Oct. 5—Leading motor car makers and others have formed a $2,000,000 company to make ordnance. A $25,000,000 Government contract is assured at the start, and Captain Goodspeed has recommended the purchase of the new plant of the Saxon Motor Co. for this deal.

Those interested in the formation of the company include Alvin Macauley, president of Packard; Roy D. Chapin, president of Hudson; John Trix, head of the American Injector Co.; George Dunham, engineer; W. C. Anderson, president of the Anderson Electric Co.; Harry W. Ford and L. C. Van Bevaer of Saxon; and C. A. Pfeffer, formerly secretary of Chalmers.

ELGIN SCOUT BACK IN CHICAGO

Chicago, Oct. 9—With official seals on hood, gearset and clutch unbroken, the Elgin Scout car rolled into Chicago this morning, half of its long trip completed. Two score Elgin rooters met the scout car at the city limits and escorted it through cheering crowds to the Chicago Motor Club where President Hayes examined the seals. They were found intact, not having been touched during the entire 6000 miles of the trip.

On breaking the seals and lifting the hood the motor was found in running order, hitting as smoothly as when it pulled away from the club on August 4 on its trip to Los Angeles and back. Clutch, gearset and all working parts were certified to be in excellent condition and there seemed no reason to doubt the claims of the car's drivers that the car could have been driven the balance of its proposed 12,000-mile trip without mechanical attention.

In a few days the car will leave for St. Louis to resume its trip to New York, back to Chicago via the Lincoln highway, and from there to Miami, Fla., and back, covering the entire mileage of the Dixie highway.

WILLYS HEADS ARMY RECREATION

Washington, Oct. 5—John N. Willys has been appointed chairman of the National Committee on War Camp Community Recreation Fund, which is to direct the campaign to raise $3 for every soldier and sailor. Mr. Willys will have associated with him men of national prominence in nearly every city of the country.

WANT ROAD ENGINEERS

Washington, D. C., Oct. 7—Ten thousand five hundred men with road building experience are wanted by the engineer corps for a new brigade which is soon to go to France to build roads for the American expeditionary forces.

Aircraft Makers Meet

WASHINGTON, Oct. 5—Many proposed airplane standards could have been adopted at the two-day meeting held here this week if a quorum had been present when they were taken up. Almost everyone engaged in a business having anything to do with aircraft is exceedingly busy just now, and, as Howard E. Coffin said in addressing the meeting, it is very difficult to get action on many things.

The meeting was called by the aircraft production board of the Council of National Defense for representatives of all interests concerned in aircraft manufacture to meet and place in effect definitely a series of standards for airplane fittings worked out by the aeronautic standards committee of the Society of Automotive Engineers acting in co-operation with the board. The Army and Navy, as well as aeronautical makers and engineers, were represented, and the meeting is expected to advance a common simplified practice in airplane parts and appliances and in specifications of materials.

Included in the list of subjects for which standards have been established by the committee are dope and varnish, engine testing specifications, inspection methods, machine-gun mounting, propeller ends, safety belts, nonferrous alloys and steel alloys. The committee previously had determined standards for many important parts, such as stick and wheel controls, bearings, engine supports, magneto dimensions, screws and bolts of various types, various grades of steel and heat treatments.

Makers Draw National Show Space

Those Who Will Be at New York and Chicago and Those Who Will Not

NEW YORK, Oct. 5—More than 200 companies were represented at the meeting of the National Automobile Chamber of Commerce yesterday when the drawing for space at the New York and Chicago shows took place. Sam Miles, the veteran manager of the two national exhibitions, came from his summer home at Christmas Cove, Me., to handle the work, and Colonel Charles Clifton, the perpetual president of the association, and Alfred Reeves, the general manager, were there also. Show-drawing day is one of the biggest in the association year, and yesterday was no exception. Headquarters were filled from early morning until late in the afternoon.

First position was obtained by Willys-Overland with Buick, Dodge Brothers, Studebaker, Maxwell, Chevrolet, Cadillac and Hudson following in the order named. The drawing for Chicago space resulted in all spaces in the Coliseum and Armory being taken, as well as in what is known as the Greer building.

More Than Ever

The number of exhibitors for both cars and accessories is larger than for any previous show, and all the space on the four floors of Grand Central Palace and the Chicago buildings will be filled to overflowing. The New York show will be held the week of Jan. 5-12 and the Chicago show from Jan. 26 to Feb. 2.

While the number drawing for space this year is approximately 20 less than that of a year ago, the firms drawing this year represent the best in the industry. Among those who were present last year but will be missed this year at New York are: Ben Hur, Bour Davis, Briggs Detroiter, Cunningham, Bateman, Barley, Dole, Drexel, Emerson, Enger, Ingram-Hatch, Kent, Lozier, Majestic, Metz, Pullman, Pathfinder, Princess, Sun and Sterling. Several exhibitors will be added to the list before the show opens, as several spaces on the third floor of the Palace and several spaces on the fourth floor remain.

The exhibit of electrics at New York will be practically the same as a year ago. They have been given a space by themselves on the second floor where the following makes will exhibit: Woods, Detroit, Ohio, Milburn and Baker-R. & L. With the Baker R. & L. exhibit will be the Owen Magnetic cars.

The privilege of first choice for the New York show fell to Willys-Overland, a privilege which it has enjoyed for the last three years. The order of drawing was: Second position, Buick; third, Dodge. Others in order of drawing were Studebaker, Maxwell, Chevrolet, Cadillac, Hudson, Packard, Reo, Oakland, Chandler, Saxon, Paige, Oldsmobile, Pierce-Arrow, Chalmers, Mitchell, Hupmobile, Franklin, Haynes, Marmon, Nash, Velie, Cole, Dort, Winton, Grant, National, KisselKar, Stearns, Briscoe, Stutz, Peerless, Allen, Premier, King, Lexington, Scripps, Moon, Auburn, Apperson, Crow, Inter-State, Mercer, Case, Marion-Handley, Elcar, Jackson, Fiat, Empire, Westcott, Monroe, Paterson, Regal, Davis, Moline, Liberty, Jordan, Standard, McFarlan, Abbott, Hollier, HAL, Columbia, Kline and Austin.

The representation of manufacturers present was very good compared with former years. The majority of the factories had their leading men present to select the space but some of them delegated the work to their New York distributors or dealers.

As soon as drawing for the New York show was completed, the drawing for space for the Chicago show to be held in the Coliseum and Armory was taken up. The same order of drawing was followed out and the four leaders, namely, Willys-Overland, Buick, Dodge Brothers and Studebaker, selected the four corner spaces in the center of the Coliseum. All of the space in the Coliseum, Annex and Armory was taken. In addition several of the spaces in the Greer building were drawn. There still remains several spaces in the Greer building to be allotted, and when these are taken spaces in the basement of the Coliseum Annex will be available.

The exhibitors at the Chicago show are practically the same as at the New York show, with the exception that Glide and Dorris will be at Chicago.

Several concerns which exhibited last year at Chicago will not be there at the coming show. Among these are: American, Ben Hur, Briggs Detroiter, Classic, Cunningham, Dixie, Emerson, Enger, Hassler, McFarlan, Maibohm, Metz, Pan American, Pathfinder, Princess, Pullman, Sun, and Standard. It is possible that some of these later may decide to take space in Chicago.

The figures show that already eighty exhibitors have drawn space for the Chicago show as compared with ninety-four that drew a year ago. It is impossible to state as yet how many exhibitors Chicago will have, as new names will be added from week to week. The exhibit of electrics in Chicago will be similar to last year, space being allotted to them along the center aisle of the Armory. The exhibitors will be Woods, Detroit, Ohio, Milburn and Baker R. & L. The Stanley steamer will be exhibited for the first time.

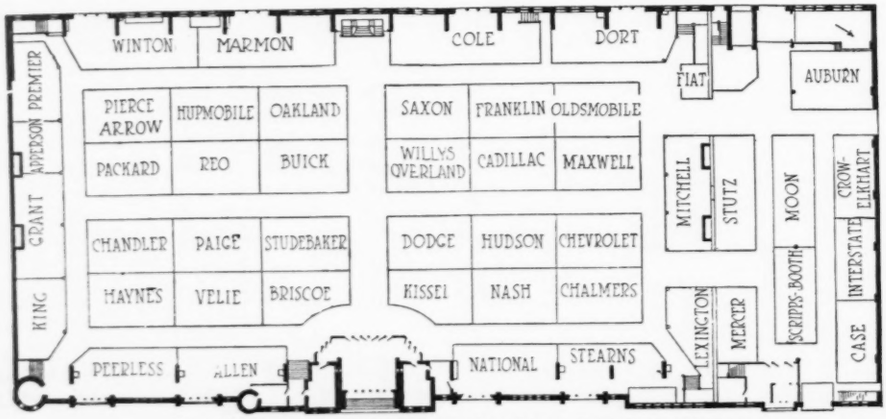
New York Show Exhibitors

MAIN FLOOR—MOTOR CAR SECTION

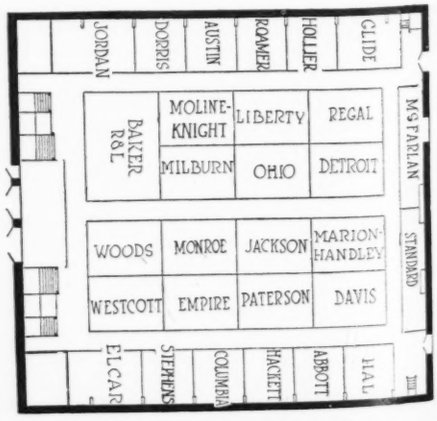
Buick Motor Co., Flint, Mich.
Briscoe Motor Corp., Jackson, Mich.
Cadillac Motor Car Co., Detroit.
Chalmers Motor Co., Detroit.
Chandler Motor Car Co., Cleveland, Ohio.
Chevrolet Motor Co. of Michigan, Flint, Mich.
Cole Motor Car Co., Indianapolis, Ind.
Dodge Brothers, Detroit.
H. H. Franklin Mfg. Co., Syracuse, N. Y.
Grant Motor Car Corp., Cleveland, Ohio.
Haynes Automobile Co., Kokomo, Ind.
Hudson Motor Car Co., Detroit.
Hupp Motor Car Corp., Detroit.
Kissel Motor Car Co., Hartford, Wis.
Lexington Motor Co., Connersville, Ind.
Maxwell Motor Corp., Detroit.
Mitchell Motors Co., Inc., Racine, Wis.
National Motor Car & Vehicle Corp., Indianapolis, Ind.
Nash Motors Co., Kenosha, Wis.
Nordyke & Marmon Co., Inc., Indianapolis, Ind.
Oakland Motor Car Co., Pontiac, Mich.
Olds Motor Works, Lansing, Mich.
Packard Motor Co., Detroit.
Paige-Detroit Motor Car Co., Detroit.
Pierce-Arrow Motor Car Corp., Buffalo, N. Y.
Reo Motor Car Co., Lansing, Mich.
Saxon Motor Car Corp., Detroit.
F. B. Stearns Co., Cleveland, Ohio.
Studebaker Corp. of America, South Bend, Ind.
Velie Motors Corp., Moline, Ill.
Willys-Overland, Inc., Toledo, Ohio.
Winton Co., Cleveland, Ohio.

SECOND FLOOR—MOTOR CAR SECTION

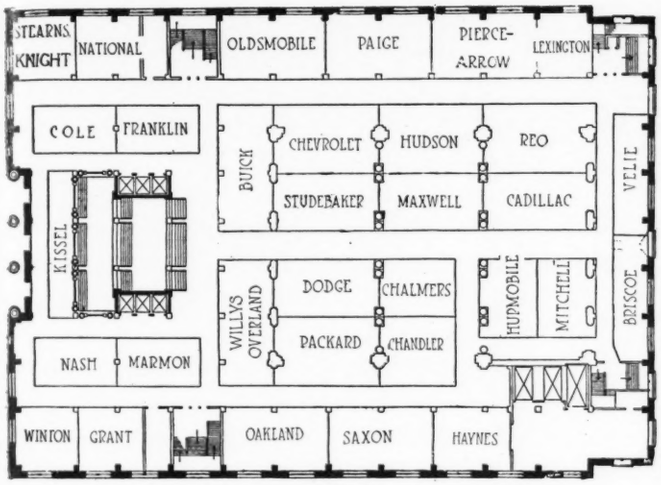
Allen Motor Co., Fostoria, Ohio.
Apperson Bros. Auto Co., Kokomo, Ind.
Auburn Automobile Co., Auburn, Ind.
J. I. Case T. M. Co., Racine, Wis.



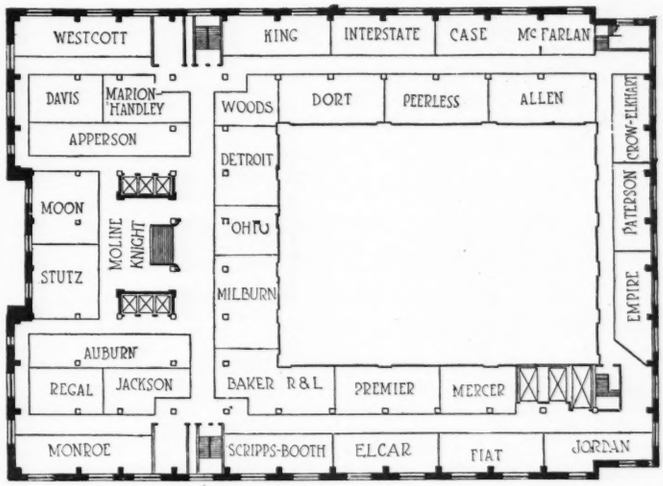
How the space in the Coliseum has been allotted to exhibitors



Exhibits and spaces in Chicago Armory



Order of exhibits on main floor of Grand Central Palace



Order of exhibits on second floor of Grand Central Palace

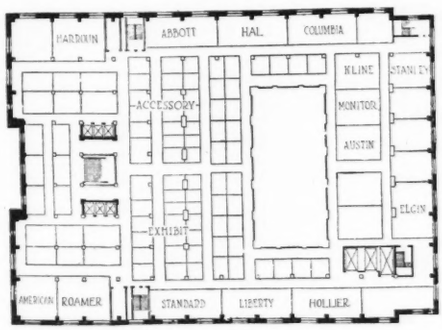
Crow-Elkhart Motor Co., Elkhart, Ind.
George W. Davis Motor Car Co., Richmond, Ind.
Dort Motor Car Co., Flint, Mich.
Elkhart Carriage & Motor Co., Elkhart, Ind.
Empire Automobile Co., Indianapolis, Ind.
Fiat Automobile Co., Poughkeepsie, N. Y.
Inter-State Motor Co., Muncie, Ind.
Jackson Automobile Co., Jackson, Mich.
Jordan Motor Car Co., Cleveland, Ohio.
King Motor Car Co., Detroit.
McFarlan Motor Co., Connersville, Ind.
Mutual Motors Co., Jackson, Mich.
Mercer Automobile Co., Trenton, N. J.
Moline Automobile Co., East Moline, Ill.
Monroe Motor Co., Pontiac, Mich.
Moon Motor Car Co., St. Louis, Mo.
W. A. Paterson Co., Flint, Mich.
Peerless Motor Car Co., Cleveland, Ohio.
Premier Motor Corp., Indianapolis, Ind.
Regal Motor Car Co., Detroit.
Scripps-Booth Corp., Detroit.
Stutz Motor Car Co. of America, Indianapolis, Ind.
Westcott Motor Car Co., Springfield, Ohio.

THIRD FLOOR—MOTOR CAR SECTION

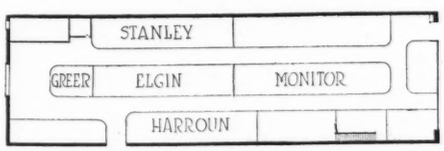
Abbott Corp., Cleveland, Ohio.
American Motors Corp., Plainfield, N. J.
Austin Automobile Co., Grand Rapids, Mich.
Columbia Motors Co., Detroit.
Elgin Motor Car Corp., Chicago.
Hal Motor Car Co., Cleveland, Ohio.
Harroun Motors Corp., Wayne, Mich.
Kline Car Corp., Richmond, Va.
Lewis Spring & Axle Co., Chelsea, Mich.
Liberty Motor Car Co., Detroit.
Monitor Motor Car Co., Columbus, Ohio.
Roamer Motor Car Co., Chicago.
Standard Steel Car Co., Pittsburgh, Pa.
Stanley Motor Carriage Co., Newton, Mass.

SECOND FLOOR—ELECTRIC CARS

Anderson Electric Car Co., Detroit.
Baker R. & L. Co., Cleveland, Ohio.
Milburn Wagon Co., Toledo, Ohio.
Ohio Electric Car Co., Toledo, Ohio.
Woods Motor Vehicle Co., Chicago.



Exhibits on third floor of Palace



These will show in the Greer building

Chicago Show Exhibitors

COLISEUM AND ANNEX—MOTOR CAR SECTION

Allen Motor Co., Fostoria, Ohio.
Apperson Bros. Automobile Co., Kokomo, Ind.
Auburn Automobile Co., Auburn, Ind.
Briscoe Motor Corp., Jackson, Mich.
Buick Motor Co., Flint, Mich.
Cadillac Motor Car Co., Detroit.
Case T. M. Co., J. I., Racine, Wis.
Chalmers Motor Co., Detroit.
Chandler Motor Car Co., Cleveland, Ohio.
Chevrolet Motor Co., Flint, Mich.
Cole Motor Car Co., Indianapolis, Ind.
Crow-Elkhart Motor Co., Elkhart, Ind.
Dodge Brothers, Detroit.
Dort Motor Car Co., Flint, Mich.
Fiat Automobile Co., Poughkeepsie, N. Y.
Franklin Mfg. Co., H. H., Syracuse, N. Y.
Grant Motor Car Co., Findlay, Ohio.
Haynes Automobile Co., Kokomo, Ind.
Hudson Motor Car Co., Detroit.
Hupp Motor Car Co., Detroit.
Inter-State Motor Co., Muncie, Ind.
King Motor Car Co., Detroit.
Kissel Motor Car Co., Hartford, Wis.
Lexington Motor Co., Connersville, Ind.
Maxwell Motor Co., Detroit.
Mercer Automobile Co., Trenton, N. J.
Mitchell Motors Co., Racine, Wis.
Moon Motor Car Co., St. Louis, Mo.
Nash Motors Co., Kenosha, Wis.
National Motor Vehicle Co., Indianapolis, Ind.
Nordyke & Marmon Co., Indianapolis, Ind.
Oakland Motor Car Co., Pontiac, Mich.
Olds Motor Works, Lansing, Mich.
Packard Motor Car Co., Detroit.
Paige-Detroit Motor Car Co., Detroit.
Peerless Motor Car Co., Cleveland, Ohio.
Pierce-Arrow Motor Car Co., Buffalo, N. Y.
Premier Motor Corp., Indianapolis, Ind.
Reo Motor Car Co., Lansing, Mich.
Saxon Motor Car Co., Detroit.
Scripps-Booth Corp., Detroit.
Stearns Co., F. B., Cleveland, Ohio.
Studebaker Corp. of America, Detroit.
Stutz Motor Car Co., Indianapolis, Ind.
Velie Motors Corp., Moline, Ill.
Willys-Overland, Inc., Toledo, Ohio.
Winton Co., Cleveland, Ohio.

ARMORY—MOTOR CAR SECTION

Bartholomew Co., Peoria, Ill.
Abbott Corp., Cleveland, Ohio.
Austin Automobile Co., Grand Rapids, Mich.
Columbia Motors Co., Detroit.
George W. Davis Motor Car Co., Richmond, Ind.
Dorris Motor Car Co., St. Louis, Mo.
Elkhart Carriage & Motor Car Co., Elkhart, Ind.
Empire Automobile Co., Indianapolis, Ind.
Hal Motor Car Co., Cleveland, Ohio.
Hackett Motor Car Co., Jackson, Mich.
Jackson Automobile Co., Jackson, Mich.
Jordan Motor Car Co., Cleveland, Ohio.
Lewis Spring & Axle Co., Jackson, Mich.
Liberty Motor Car Co., Detroit.
McFarlan Motor Co., Connersville, Ind.
Maxwell Motor Corp., Detroit.
Moline Automobile Co., East Moline, Ill.
Mutual Motors Co., Jackson, Mich.
W. A. Paterson Co., Flint, Mich.
Regal Motor Car Co., Detroit.
Roamer Motor Car Co., Chicago.
Standard Steel Car Co., Pittsburgh, Pa.
Stephens Motor Branch of Moline Plow Co., Freeport, Ill.
Westcott Motor Car Co., Springfield, Ohio.

ARMORY—ELECTRIC CARS

Anderson Electric Car Co., Detroit.
Baker R. & L. Co., Cleveland, Ohio.
Milburn Wagon Co., Toledo, Ohio.
Ohio Electric Car Co., Toledo, Ohio.
Woods Motor Vehicle Co., Chicago.

GREER BUILDING—MOTOR CAR SECTION

Elgin Motor Car Corp., Chicago.
Harroun Motors Corp., Detroit.
Monitor Motor Car Co., Columbus, Ohio.
Stanley Motor Carriage Co., Newton, Mass.

ST. LOUIS HOLDS OPEN HOUSE

St. Louis, Mo., Oct. 8—An exhibit of fall and winter cars began here today when forty-seven firms announced open house to all visitors to view the closed and semi-closed cars made by fifty-four companies for the season of 1917-18.

The week's activities are under the direction of the St. Louis Automobile Manufacturers' and Dealers' Association, but only those members who have been able to obtain winter model cars are participating. The exhibit is on the row, and exhibitors whose salesrooms are not located on the row have been allotted space in salesrooms of members more favorably located.

The plan is similar to that followed last year when it was called Open Week, but that name is not used this year. In all the publicity the activities have been referred to as "closed car exhibit."

The salesrooms have been decorated but not elaborately, and special lighting has been arranged by most of the dealers. The general plan is less elaborate than last year, because the event is more of a local nature. Last year the exhibit was held with the fall carnival, which attracts thousands of visitors to the city, but this year the carnival was not held and the association has not attempted to attract visitors for their exhibit, although considerable advertising has been done through the local trade territory. Several sub-dealer meetings have been arranged for the week, as in several cases this is the first showing of the new models here.

A new feature is the truck exhibit. Arrangements were made with the city to close Garrison avenue, which is midway of the row, for a block north and south of the row, and special lights were installed. This space was opened to trucks. H. L. Sutton of the show committee is in charge of this exhibit, and practically every truck dealer in the city is taking part. The expense of the lighting fixtures will be prorated among the exhibitors. It is likely that a truck association will be organized as a result of the show.

Bringing Up Troops By Motor Cars in France

By W. F. Bradley

MOTOR AGE'S Special Correspondent with the Armies in France

SPECIAL motor cars are employed in the French army for the rapid transportation of troops. These are Paris motorbus-type chassis, with engine under the driver's feet and a long, single-deck body carrying thirty-six men in addition to the driver and mechanic. Some of these vehicles went straight from Paris service to the war; the later ones, while not differing mechanically, had much lighter and cheaper bodies, the glass windows, for instance, being abolished in favor of canvas sides.

Mobilization of Buses

A troop-carrying motor bus is not suitable for general war service. On this account the French army authorities keep the number of special troop-carrying motor cars as low as possible and make a call on the general service 3½- and 5-ton trucks whenever big bodies of men have to be moved from place to place. Thus, in the French army there are two general services—Transportation of Troops and Transportation of Material. The former vehicles can be used economically only for carrying men; the latter are designed for transporting general war material but are quite satisfactory in the troop transportation department whenever—and this occurs rather frequently—the special vehicles are not sufficient to meet all requirements.

Long before the war clouds formed in Europe it had been decided that on general mobilization being ordered the Paris buses should pass over to the war department as troop-carrying vehicles or fresh-meat wagons. This change had been rehearsed so often in manouvers that when the storm did break the transformation took place quite normally, the Paris buses being the first fleet of motor cars to go into war service. The knowledge that the vehicles, on some vague date, might have to become a part of the army service undoubtedly influenced design and explains why the Paris buses were heavier than those in use in some other European cities. For their own class of work, carrying loads not often exceeding 2½ tons, this type of vehicle has proved very satisfactory under the stress of war. Proof of this is found in the fact that after three years' hard war service, during which time they have never been sent away from the front, hundreds of these vehicles are giving as reliable service as the day they went out of Paris.

There are two types of bus chassis, one built by De Dion Bouton, the other by Schneider. While details differ considerably, general features are the same. The De Dion Bouton engine is a separately cast four-cylinder of 110 by 150 mm. bore and stroke, about 4.33 by 5.9 in., developing 30 hp. at 1000 r.p.m. The engine is thermo-syphon cooled with the use of a special circular copper tube radiator surrounding a centrifugal fan. The entire system of tubes is mounted in sheet steel casing; the centrifugal fan runs at a lower speed than the usual propeller fan and is more efficient, while dust is not drawn in onto the engine. Forced feed oil lubrication is applied to all engine parts.

The Schneider engine is also a four-cylinder of 125 by 140 mm. bore and stroke, about 4.9 by 5.5 hp., with superimposed valves, the inlets being operated by push-rods and overhead rockers from a single camshaft with keyed-on cams. Unlike the De Dion, a circulating splash oil system is used. The engine is governed to 900 r.p.m., at which speed it develops 30 hp. Both makes of chassis have three speeds and reverse with final drive by internal gears and are devoid of torque and radius rods. The gear ratios give a road speed of 14, 8, and 4 m.p.h. and 2.7 on reverse.

The wheelbase of the troop-carrying motor car is 175 in., but the total chassis length is 298 in. The rear width is 86 in., and over the front axle caps 81 in. The body length necessary for passenger-carrying service is obtained by placing the driver over the engine and by a rear platform lower than the main frame. A subsidiary frame is built laterally on the main frame, so that the body is equal to the width between the hub caps. The chassis weight is 7200 lb., and the total weight in running order rather more than 11,000 lb. This represents the weight of the vehicle as originally designed for city service. For war work interior fittings can be simplified considerably by such means as the abolition of window frames, partitions, wood panels, etc., making an appreciable reduction in weight. The live load is higher, however, for while a city passenger carries no baggage, a soldier is loaded heavily. Thus, fully loaded on war service, the total weight of the bus is not less than 17,000 lb.

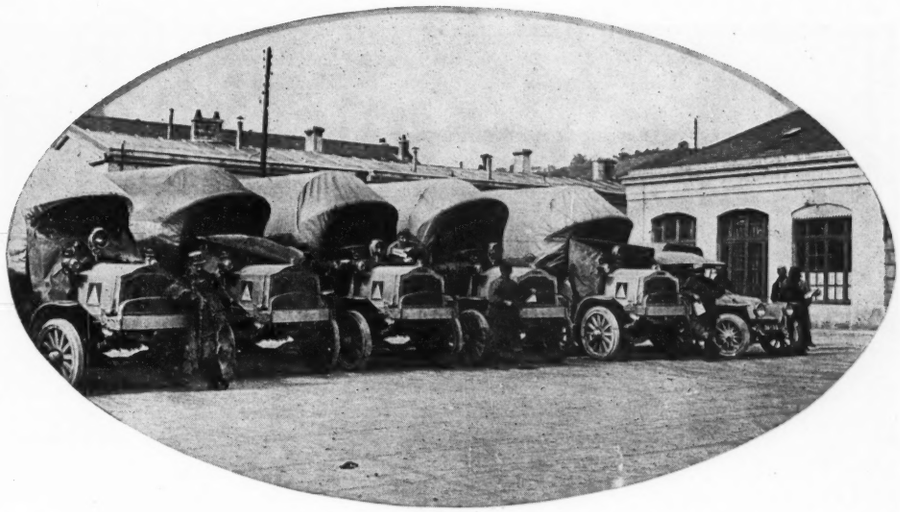
Buses Called First

When big troop movements are under contemplation, the first call is made on the former Paris bus vehicles. Next the ordinary transport trucks are brought into service, and as the ratio between the two is at least 1 to 20, in any big operation it invariably happens that ordinary trucks

Motor trucks meet the French troops at the railroad station behind the fighting lines and transport them to their posts

on troop-carrying work outnumber the special vehicles.

The troop-carrying buses take a load of thirty-six men; an ordinary 3½-ton truck with a couple of seats placed longitudinally cannot handle more than twenty-four, if the haul is of any length and the comfort of the men has to be considered. Taking the average weight of the men, with kit, as 180 lb., the live load is less than 4500 lb., and is obviously below the efficiency load of the vehicle. However, this is a problem not of weight but of space. With a view to increasing the load, trailers have been employed behind ordinary trucks. Many 5-ton Pierce-Arrow trucks have been used in this way, the load being increased to forty men with a solid-tired two-wheel trailer. The experiment has not given complete satisfaction, it having been found that the addition of a trailer causes the truck to work too near its safety limits and results in a general deterioration, although the truck on which the experiments have been carried out is undoubtedly one of the best. On this account the use of trailers behind ordinary trucks is more or less occasional.



A scene at a railroad station in France—Packard trucks waiting to take troops up to the trenches on the firing line

Cannot Travel on Foot

Infantry transportation by motor trucks has received an extensive development on all parts of the French front. Men returning from leave by railroad and deposited at the terminus station, which, owing to the enemy fire may be from 5 to 12 miles from their quarters, are not allowed to make the journey on foot. Outside the railroad depot a big poster orders the men to group themselves before a letter or number representing their particular camp or quarters. The men wait there until a motor vehicle—either an ordinary truck or a special troop-carrying motor car—picks them up. It is found more economical to run a motor service than to allow the men to come up on foot and without control. In the latter case they are apt to stray, to loiter on the road and not infrequently to arrive at their quarters drunk and unfit for service for several days.

After a period of duty in the trenches men are brought to the rear by motor vehicles. The service provides for the carrying of fresh troops to some point behind the trenches, the distance depending largely on topographical conditions, then the return of the tired troops to the quarters prepared for them in the rear. In the case of an important attack, or when preparations have to be made to drive off an enemy attack, troop-carrying motor cars are used on an extensive scale. Occasions are comparatively common when the motor service has been instructed to transport an army corps of 30,000 men within a period of 10 hr.

The special troop-carrying motor cars have a speed of 14 m.p.h., while the ordinary trucks usually are not run higher than 12 m.p.h. It is possible, however, to estimate on a commercial average of 10 m.p.h. for troop-moving operations under normal road conditions. The length of trips in moving troops from point to point varies from 20 to 40 miles. To take one specific example, when the Germans were making their great attacks on Verdun, in the early months of 1916, all fresh troops were brought from Bar-le-Duc to Verdun by motor trucks, a distance of 35 miles, making 70 miles for the round trip. With the use of 1250 3½-ton trucks, 30,000 men could be taken to the front in just under 4 hr. actual time. With 625 trucks the same number of men could be carried in 14 hr. By the use of special troop-carrying motor cars, taking thirty-six men aboard each, a fleet of 840 is sufficient to carry 30,000 men a distance of 35 miles within 4 hr. While fleets of 840 troop-carrying motor cars are available, it usually happens that when an army of 30,000 men have to be handled in a limited space of time, the convoys are a mixture of ordinary trucks and troop-carrying vehicles.

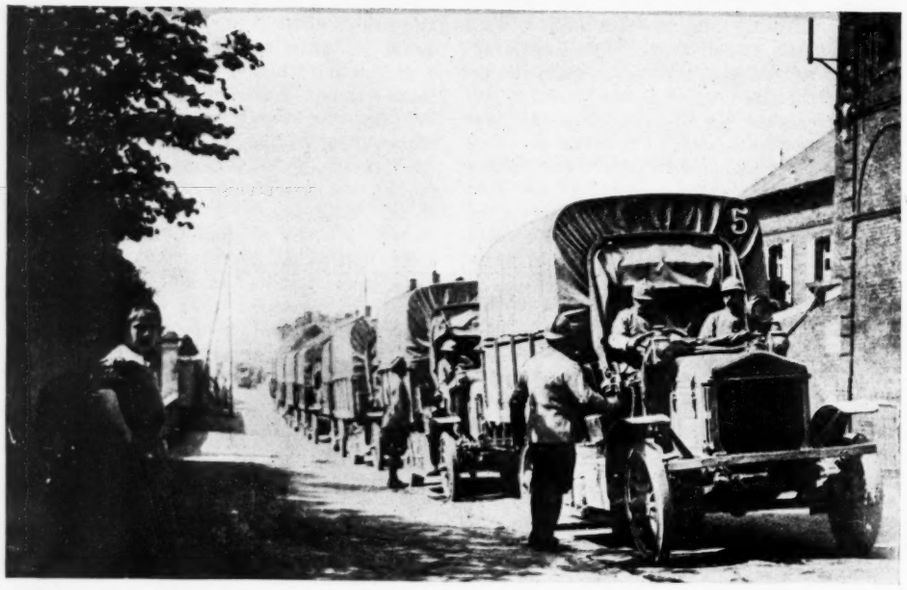
These buses rolled up and down the boulevards of France before the war but now they carry troops of soldiers

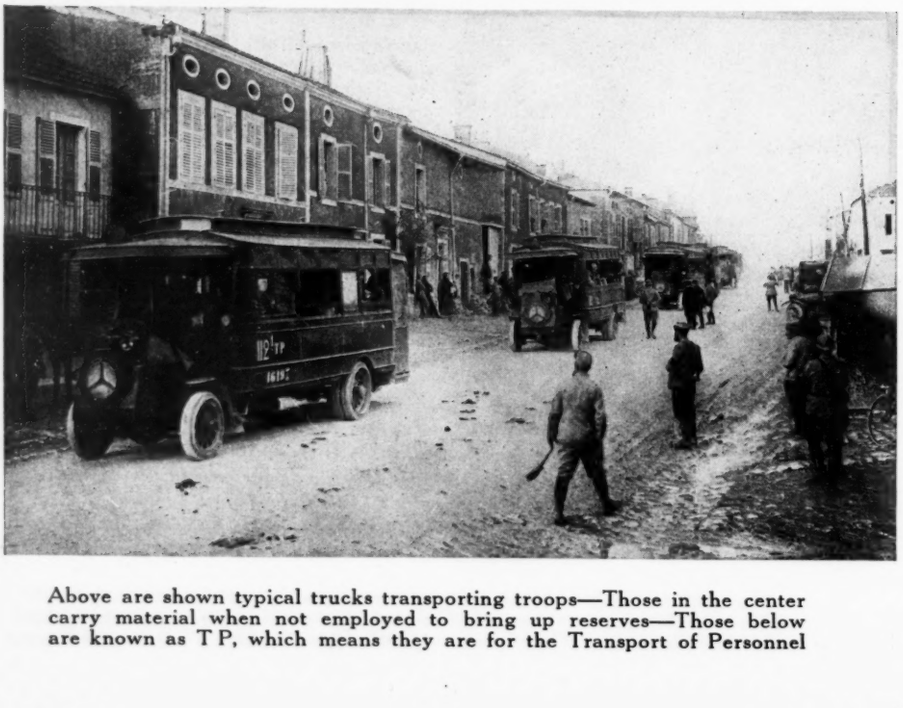
40 Miles Usual.

On trips to and from the front it is not often that a distance of 40 miles is exceeded. Under this distance railroads are apt to be precarious, owing to enemy bombardment, but beyond this distance rail transportation always can be counted on. There have been numerous occasions, however, when the allies in France have had to move big bodies of troops parallel to their front, in a direction at right-angles to all the main railroad lines. Under such conditions the motor service is supreme by reason of its greater elasticity. Also when these movements have to be made the distance covered on a single trip will run as high as 100 miles.

It has been found impossible to move big bodies of troops by motor cars without a very efficient traffic control system. The French adopt what they officially designate as the guarded road system. Under this the route to be followed by the convoys is marked off into cantons of about 6 miles in length, each canton being under the direct control of a traffic squad and every squad being in telephonic communication with the others.

Although the units on the road are a section comprising fifteen to twenty trucks under the charge of a lieutenant, traffic conditions necessitate these being split into sub-sections of five trucks, which are considered by the traffic squad as a train and consequently indivisible. The five vehicles of a sub-section remain always in close convoy formation, but a distance of





Above are shown typical trucks transporting troops—Those in the center carry material when not employed to bring up reserves—Those below are known as T P, which means they are for the Transport of Personnel

50 yd. invariably is maintained between the respective sub-sections. If the sub-section ahead stops or slows down, the one immediately behind must do the same to preserve the regulation 50-yd. gap. As a guide to the drivers, the last truck of each sub-section carries a real disk emerging above the top of the body.

Almost a Block System

The system adopted is practically the same as the block system used on railroads. The traffic squad has entire responsibility on the length of road entrusted to them, and in case of a breakdown or an acident it is up to them to get the obstruction out of the way, even to the complete loss of the truck if no less drastic remedy is available. Under such a system the departure and arrival of fleets of motor vehicles running into a few thousands can be relied on with mathematical accuracy. According to general conditions a guarded road will be used for one or two-way traffic and for all motor car or a mixture of motor car and horse vehicles to the exclusion of cavalry or troops afoot. Where the highest efficiency is desired, the road is barred to everything but mechanical traction.

Wonderful as are some city traffic control systems, they are less remarkable than the control exercised on military roads at the front. Obviously there can be no question of the willingness or otherwise of the individual drivers to obey the regulations drawn up. The traffic squad has undisputed authority, while obedience to the regulations may be the essential condition of the personal safety of the men. In villages, at crossroads, at the approaches to bridges, which are probably of a temporary nature and frequently under fire, numerous direction posts are erected for the benefit of drivers, and at most of these places a special traffic man is permanently on duty. Small French towns and villages invariably are twisted and complicated, so that the only way to avoid loss of time and a general hold up of traffic is to mark off through routes for the different destinations and the different types of traffic and to show these routes by boards placed at frequent intervals.

Signs Are Adopted

As a matter of recognition, each group of forty-five to fifty-seven trucks adopts some distinctive sign—two peasant children under a big umbrella, a cock within a cogwheel, a hare and a tortoise, etc. As four groups are united into a groupment for matters of administration, repairs, etc., the same sign is adopted for all four with different color combinations. Thus the design indicates the groupment, and the combination of colors tells to which of the four groups any particular truck belongs. This is in addition to the number given to each truck in a section, and the general army number carried by every motor vehicle at the front. It is also in addition to the red disk carried at the rear of every fifth truck when operating on a guarded road in close convoy formation. A number is always difficult to remember, while a distinctive sign tells a driver or officer immediately whether he is in presence of one of his own trucks or a stranger's.

A. B. C. of Aviation

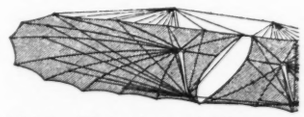


Fig. 1—Early Type of Glider

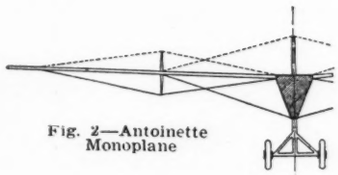


Fig. 2—Antoinette Monoplane

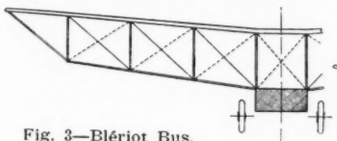


Fig. 3—Blériot Bus, Monoplane

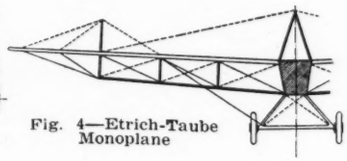


Fig. 4—Etrich-Taube Monoplane

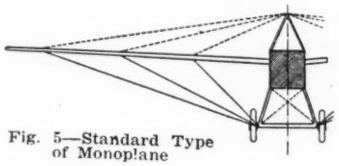


Fig. 5—Standard Type of Monoplane

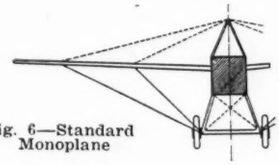


Fig. 6—Standard Monoplane

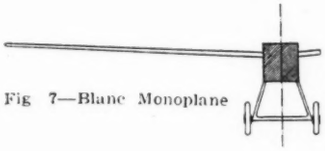


Fig 7—Blanc Monoplane

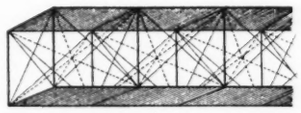


Fig. 8—Early Type of Biplane

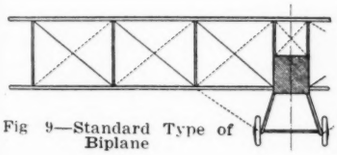


Fig 9—Standard Type of Biplane

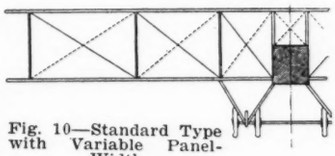


Fig. 10—Standard Type with Variable Panel-Width

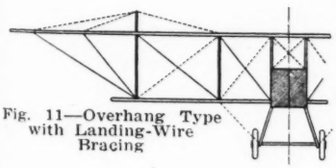


Fig. 11—Overhang Type with Landing-Wire Bracing

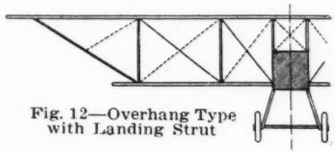


Fig. 12—Overhang Type with Landing Strut

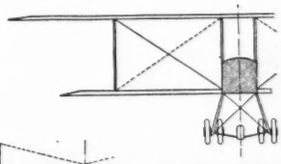


Fig. 13—Bréguet Biplane with Single Panel

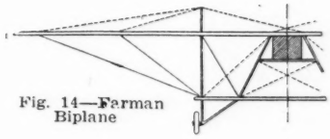


Fig. 14—Farman Biplane

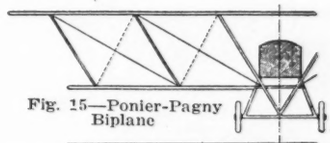


Fig. 15—Ponier-Pagny Biplane

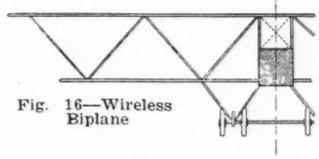


Fig. 16—Wireless Biplane

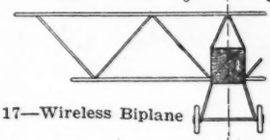


Fig. 17—Wireless Biplane

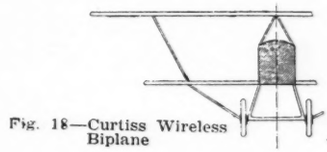


Fig. 18—Curtiss Wireless Biplane

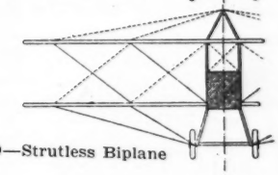


Fig. 19—Strutless Biplane

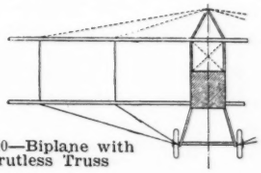


Fig. 20—Biplane with Strutless Truss

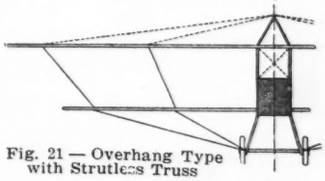


Fig. 21 — Overhang Type with Strutless Truss

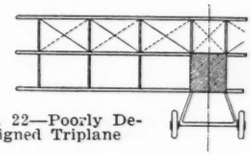


Fig. 22—Poorly Designed Triplane

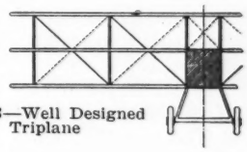


Fig. 23—Well Designed Triplane

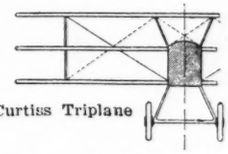


Fig 24—Curtiss Triplane

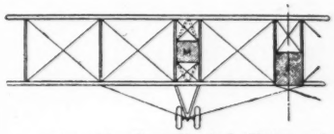


Fig. 25—Complicated Form of Biplane Truss

Monoplane, Biplane and Triplane Wing Trussing

From a paper presented at the first aeronautic session of the Society of Automotive Engineers by F. W. Pawlowski

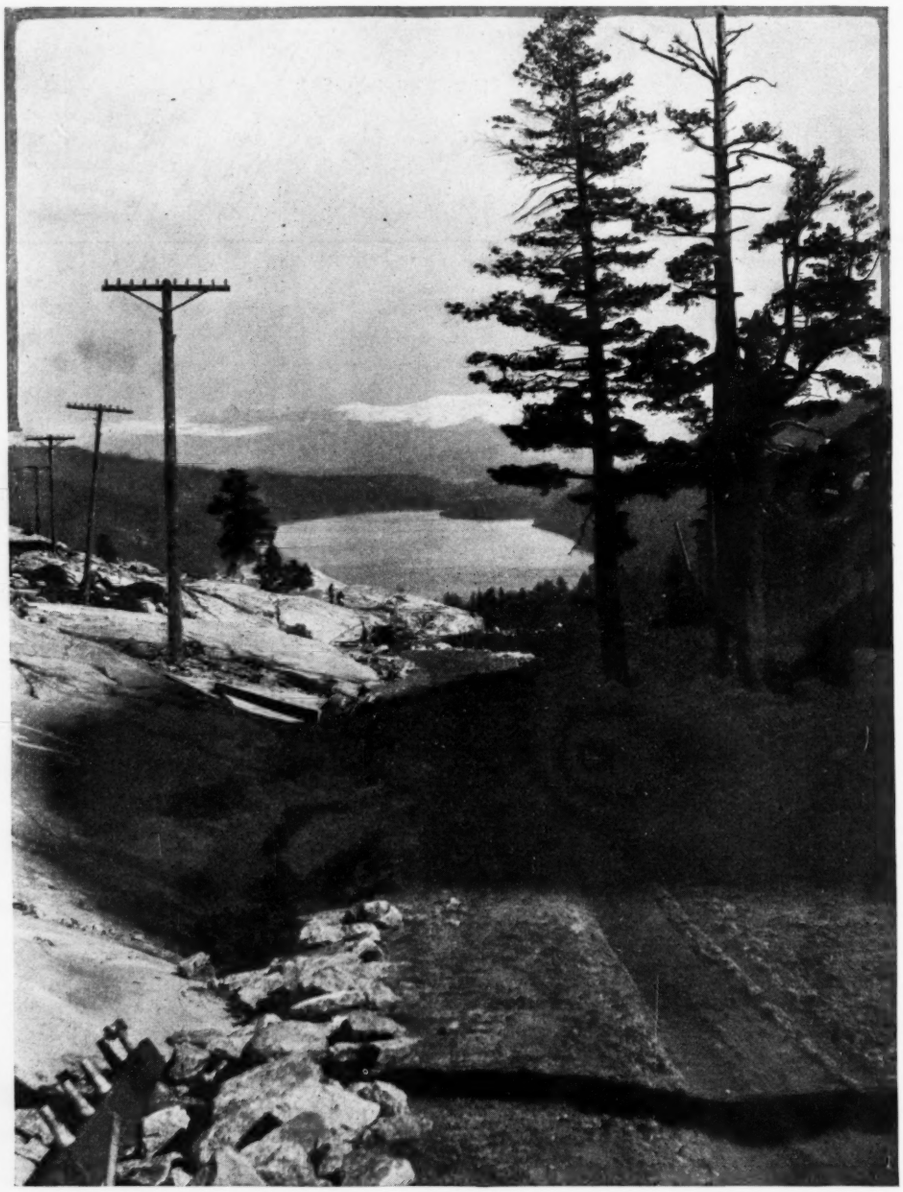
IN Fig. 1 is shown an umbrella-like construction used in the earlier types of gliders. In the Antoinette monoplane of 1909, Fig. 2, there is a considerable reduction in the number of exposed wires as compared to the umbrella type. In this, as in most of the following figures, the so-called lifting wires are shown by full lines and the landing-wires by dotted lines. In 1910 Bleriot adopted the Pratt truss for his monoplane, which was of considerable span, Fig. 3. Just a slightly different construction has survived until the present time in the German Taube, Fig. 4. The standard type of monoplane rapidly became the most popular owing to its simple construction and ease of adjustment, Figs. 5 and 6. The resistance of wires is a considerable item in the total structural resistance, so that Blanc in France actually built, in 1913, a monoplane with cantilever wings, Fig. 7.

One of the early forms of biplane trussing is shown in Fig. 8. The dotted lines represent the diagonals which eventually were omitted. The type shown in Fig. 9 soon became standard and prevails at the present time. By varying the width of panels, as shown in Fig. 10, the structure can be made lighter weight or, for the same weight, stronger. The overhang type of biplane in which the top wing is made longer than the bottom is treated either with landing-wire bracing, Fig. 11, or landing strut, Fig. 12. The Breguet biplane, Fig. 13, with single panel shows the tendency to minimize the number of wires and struts. A more radical departure is displayed by the Henry Farman half-and-half monoplane and biplane, Fig. 14. The Ponier-Pagny biplane truss, Fig. 15, with equilateral triangles formed by struts and landing wires is a modification of the Pratt truss, as its essential members are the long diagonals of the rhomboidal panels.

Typical examples of the triangular bridge truss introduced about four years ago by the Albatross company in Germany are shown in Figs. 16 and 17. These are known as wireless trusses. Recently the Curtiss company has produced a type of wireless

(*Concluded page* 31)

California Midland Scenically Replete



Looking eastward from Donner Pass. Donner Lake in background—near Truckee

By Wisner Gillette Scott

Executive director California National Defense Highway Association; executive secretary Inyo Good Road Club; vice-president National Midland Trail Association for California; chairman division of National Parks, National Highways Association

CALIFORNIA is peculiarly fortunate in that four of the five great transcontinental highways terminate within her borders.

One enters the state in the Lake Tahoe region, one at Oasis on the California-Nevada boundary nearly due east from San Francisco, one at Needles and one at Yuma.

The one that enters the state at Oasis is known as the Midland trail, which from its inception has been strongly advocated by the Inyo Good Road Club. In 1912 it was surveyed and mapped by the American Automobile Association and later it was given great additional publicity through an elaborate map issued by the National Highways Association.

It extends from Washington to San Francisco and is 2930 miles in length—the distance by rail being 3110 miles.

It enters the state at the center of its eastern boundary, thence through Westgard Pass, the Sunrise Gateway—incomparably a more attractive and impressive introduction to California than any other.

Here is revealed to the west-bound motorist that which looms like a phantasm on the sky line, scarcely 20 miles away. A vision that charms the eye by its beauty and exalts the soul by its grandeur.

A few miles farther and the Midland Trail joins at right angles with El Camino Sierra—the California National Defense Military highway.

The great, main trunk highway of Eastern California—the proposed national motor truck military road—extends along the east base of the Sierra Nevadas from Los Angeles to Lakeview, Ore.—for the adaptation of which to heavy motor truck transportation, a bill is now before Congress.

At the junction in the fertile Owens Valley—a mountain rimmed basin over a hundred miles in length—is located Big Pine, the first town entered in California.

Here the motorist is afforded a choice of routes either to south or north.

By the southern route, direct to that wonderful metropolis of the southwest, Los Angeles—or deflecting from the route at Mojave over Tehachapi Pass to Bakersfield and through that inland empire, the peerless San Joaquin Valley, to the metropolis of the Pacific, San Francisco.

By the northern route, the tourist may motor to that region of continental fame, Lake Tahoe, thence westward by way of the beautiful capital of the state, Sacramento, to the bay and city that bears the name of its holy patron, Saint Francis.

Or if desirous of proceeding direct to the chief city of the coast by the favorite Midland Trail-Yosemite Route, with its wonderful scenic features of indescribable allurement, the motorist follows the road toward Tahoe as far as Mono, where he turns westward to cross the Sierras.

Seventeen miles north of Big Pine on the route just named, is Bishop, the metropolis of eastern California, a town of approximately 2000, with the motor touring conveniences that are incident to a town several times its size. Eight miles to the west of Bishop is Tungsten City, rapidly acquiring national repute for production of the mineral for which it is named.

The motorist following the Midland Trail-Yosemite Route has in close proximity for about 200 miles the majestic splendor of the Sierra highlands.

Snow-crowned peaks, thousands of feet in height; timber dotted slopes, miles in expanse; strips of close-by meadow through which speed crystal streams where leaping

trout flick defiance at the passing angler, are but bits of the infinite diversity in a picture beyond the scope of camera to reproduce, more changeful than was ever shown on screen, blended in greater perfection than mechanician can attain, and all with a movement faultlessly attuned to the passing car.

A little more than 40 miles northwest of Bishop the tourist arrives at the Casa Diablo Geyser, a hot spring that boils and steams in a manner more suggestive of the devil's kettle than of his house.

Crossing Indiana Summit, a low divide north of the geyser and the broad expanse of Mono Basin meets the eye—a shallow, saucer shaped depression 30 to 40 miles across.

In the distance, with its glint dulled by the reflected light of a gray landscape, lies Lake Mono—nearly 20 miles in width with a depth not to exceed 200 ft.—the weird Dead Sea of the West.

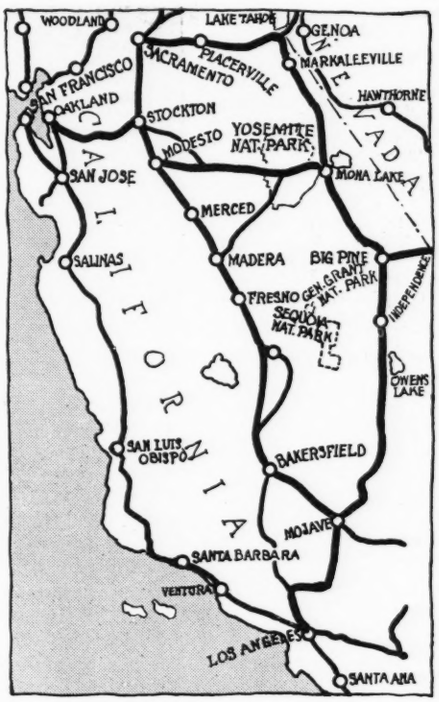
Yosemite Junction

A few miles farther is Yosemite Junction near the lake shore, where the road forks—the one ahead continuing along the water edge and on by Bridgeport and Woodfords to Lake Tahoe, the other turning westward to the left toward Tioga Pass and San Francisco.

Lake Mono offers a rare combination of touring and scientific interest.

The water is clear as the mountain streams that feed it, yet so impregnated with alkaline properties as to be totally devoid of any animate life. Although several of the tributaries here teem with trout, the fish as a rule shun the lake, except now and then one may have the misadventure to stray into the fateful waters, whereupon its hours are few.

Mono has no visible outlet save that of solar evaporation. A portion of the adjacent region is of volcanic character and an island in the lake is still sputtering and steaming from internal disturbance.



California's trail system with the Midland-Yosemite route

This vast body of mineralized water will be recalled as the scene of one of Mark Twain's tales where the cattle swam out in the lake to get a drink. A statement that might be literally true because there are various large fresh water springs arising from the lake bottom with such ebullient action as to be in some instances visible from the shore and with a force that renders necessary continuous exertion at the cars to prevent a boat drifting from the affected surface.

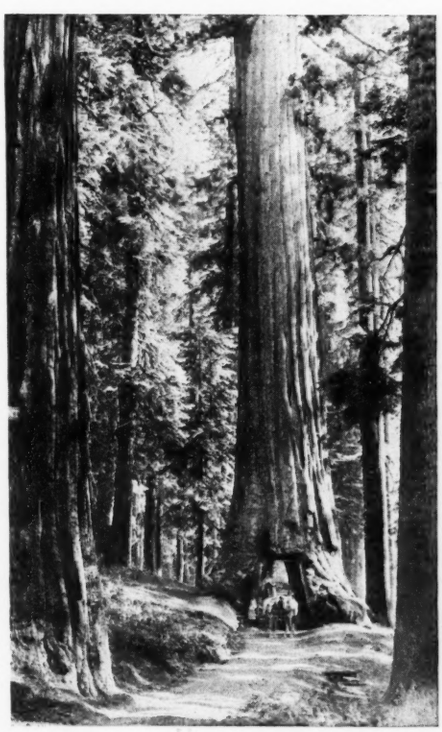
Another unusual condition at this inland sea has been utilized by Peter B. Kyne, the gripping writer of short fiction, in his story of the Mono Miracle, which tells how a mining camp parson who had incurred displeasure by his obtrusive zeal in the cause of reform was marooned on the island already mentioned, from which he later effected escape by the aid of a rock raft. Paradoxical though it may sound, investigation at the locality proves its entire feasibility. Great boulders of pumice that abound present the appearance of enormous weight which can be easily moved and when pushed out from the shore float with cork-like buoyancy on the surface of the crystal-like yet densely resistant water.

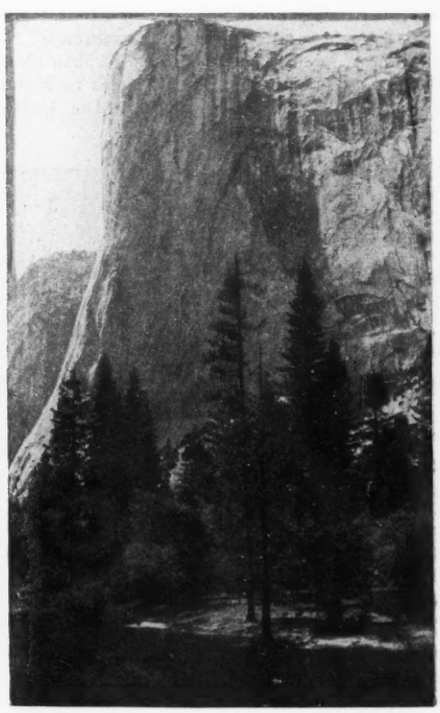
Leevining Canyon Road

Thus once again Mono enables a popular author to loop the loop with veracity unimpaired.

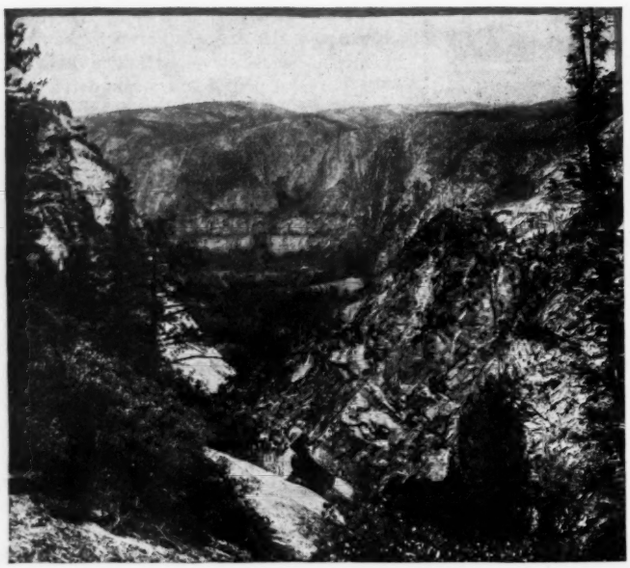
From the lake, which is 6,412 ft. above sea level, the Midland Trail-Yosemite route leads up the beautiful Leevining Canyon about 15 miles to the crest of the Sierras at Tioga Pass, with an altitude of 9941 ft. and here is the main entrance from the east to Yosemite National park. The scenery ranks with the finest in the United States and has repeatedly been pronounced superior to anything along the highways of Switzerland.

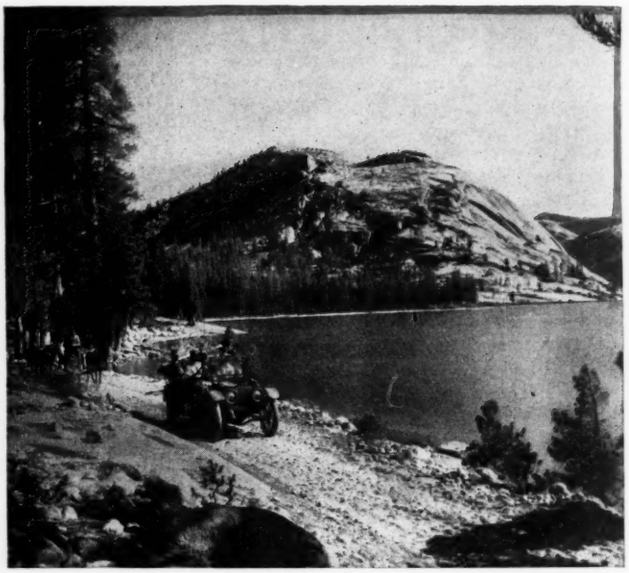
It is proper to say that all of the Midland trail in California, including its optional routes, with the exception of the road between Oasis and Big Pine, a distance of about 35 miles, is absolutely under state or federal control, both as to construction and maintenance, and while the





Left—View on the Midland trail-Yosemite route. Looking westward up Leevining Canyon towards Tioga Pass. The highway can be faintly seen along the face of the mountain on the right. Hon. John E. Raker, of North Carolina, is standing by the motor car. Center—A Yosemite tree older than the year one. Right—Scene in Yosemite National Park. El Capitan—vertical height, 3300 ft.





Left—Scene on the Midland trail-Yosemite route. Lake Tewaya in Yosmeite Park—8151 ft. above sea level. Right—A glimpse of Yosemite

larger portion of it is already in highly improved condition, the remainder is receiving similar improvement as fast as practicable.

Seven miles west of Tioga Pass Summit the Midland trail-Yosemite route lies directly across Tuolumne Meadows, a private holding of 160 acres belonging to the Sierra Club, title to which antedates that of the creation of the park by the government.

Here is located the Parsons Memorial Lodge, a spacious, one-story stone edifice, which is the summer headquarters of the famous organization. Here is also a lodge, or what would be termed in the Alps a chalet, for the benefit of the touring public.

Close at hand is a delectable soda spring free to all whether awheel or afoot. This point marks the northern terminus of the John Muir Trail which extends south along the high Sierras nearly 150 miles to Mount Whitney, the highest peak in the United States.

This thoroughfare for mountaineers named in honor of the distinguished naturalist is a direct tributary of the Midland trail and it has no connection with any other transcontinental route.

It is in course of construction as the season permits and when completed will have a minimum width of 30 in., with grade where possible not to exceed 15 per cent, and a clearance between trees of at least 6 ft. It is designed for pedestrians, saddle and pack animals and will open to the tourists of the world the most wonderful scenic region in America.

Here also the Midland trail marks the most feasible airplane route across the Sierras, the Meadows, with the approval of the Sierra Club, affording excellent facilities as a landing for aerial voyagers and as an adjunct to the California National Defense highway.

Is novelty wanted? For over 200 miles the Midland trail is merged in El Camino Sierra—the highway with a hundred byways, each byway with a hundred wonders.

Is the antique desired? The Midland trail reveals the oldest living things on earth. The motorist can halt his car in the shadows of the giant redwoods—trees that were already antiquities when work was started on the pyramids of Egypt. The identical trees that were thousands of years old when Christ was born to-day await the interested gaze of the motorist on the Midland trail-Yosemite route.

The allurement of the Midland trail is not wholly in Sierra Land, although for 50 miles it is inside the boundaries of Yosemite National park.

Continuing to the west where the Sierras slope oceanward, an optional route at Oakdale diverges to Stockton, or the main route may be followed to Modesto, thence by Tracy over a state boulevard to San Francisco.

In the near future the Midland trail will deflect at Tracy to Byron, then by way of a projected boulevard along the southern base of Mount Diablo, in which a link of only 5 miles awaits to be constructed. It will be assured the most picturesque advent upon the Pacific of any transcontinental highway in California.

Crossing the Diablo estate at the Inn the boulevard will lead through Walnut

In Yosemite National Park—Midland trail-Yosemite route—8705 ft. above sea level. Mount Hoffman in distance—10,921 ft. high

Scene on the Midland trail near Lone Pi in the United States, on distant skyline

Creek and follow the tunnel route to the classic city of Berkeley.

Emerging from the bore that pierces the Berkeley Hills the tourist, as by a sudden transformation, beholds the landscape of startling interest and fascinating beauty that borders San Francisco Bay. He beholds the metropolis of Western America and the Golden Gate, through which are seen white caps of the Pacific—white caps that may have once held vigil on Sierra Peaks along the Midland trail.

Route Information

EDITOR'S NOTE

MOTOR AGE outlines route itineraries for its readers by letter. Each week only a few of the routes asked for are published, these being those of more general interest. In asking MOTOR AGE for routes, write your name and address distinctly on a return envelope.

New York-Boston, Mass.

From New York, drive to Pelham Manor, New Rochelle, Larchmont, Mamaroneck, Rye, Port Chester, Greenwich, Conn., Cos Cob, Stamford, Noroton, Darien, Norwalk, Westport, Southport, Fairfield, Bridgeport, Stratford, Devon Station, Milford, New Haven, Forbes Corners, East Haven, Branford, Guilford, Madison, Clinton, Westbrook, Saybrook, East Lyme, New London, New London Groton ferry, Groton, Noank, Mystic, Stonington, Conn., Westerly, R. I., Charlestown, Narragansett Pier, Saunderstown, Hamilton, Wickford, East Greenwich, Apponaug, Providence, Pawtucket, North Attleboro, Mass., Plainville, Wrentham, Walpole, Norwood, Dedham, West Roxbury, Boston.

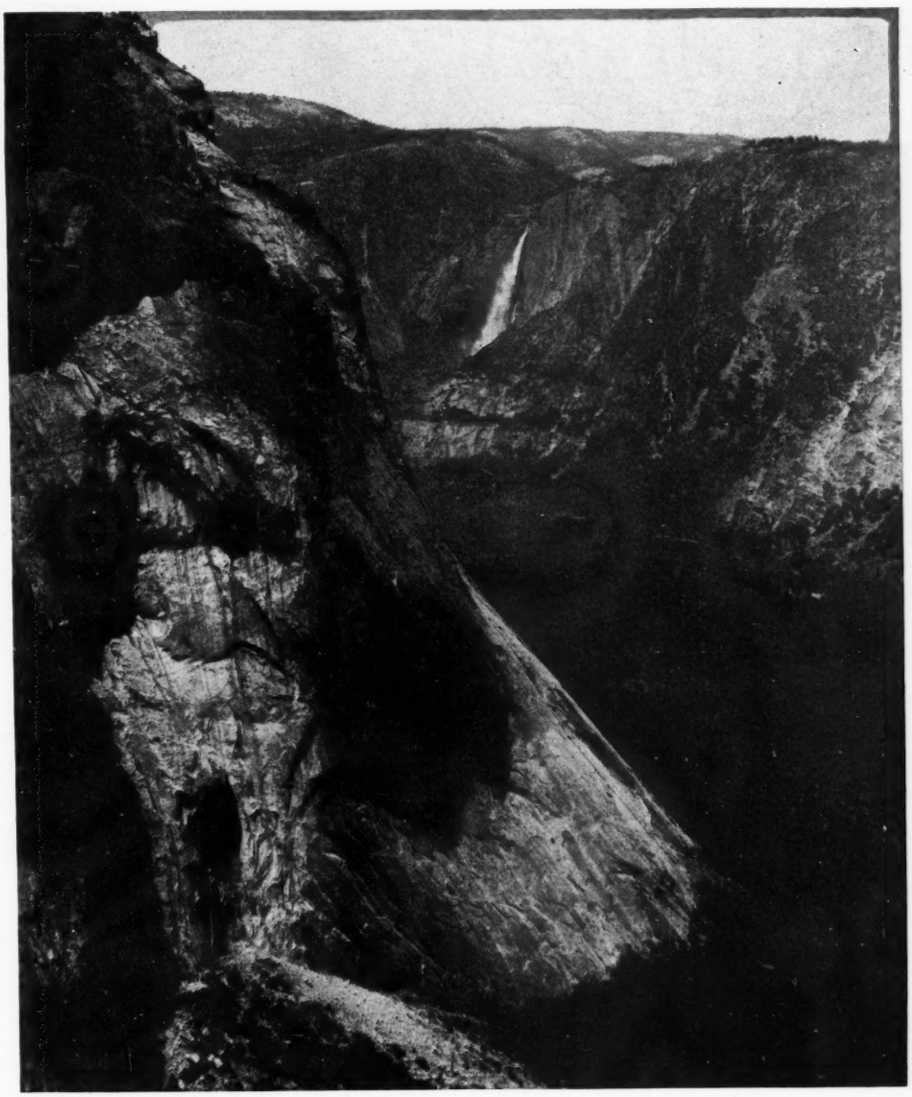
Vol. 2 of the Automobile Blue Books contains complete running directions.

Buffalo, N. Y.-South Bend, Ind.

From Buffalo, go to Evans, Angola, Brant, Farnham, Irving, Silver Creek, Sheridan, Fredonia, Brocton, Portland, Westfield, Forsyth, Ripley, N. Y., Northeast, Pa., Moorheadville, Harbour Creek, Erie, Girard, Springfield, Conneaut, Amboy, North Kingsville, East Village, Ashtabula, Saybrook, Geneva, Unionville, Painesville, Willoughby, Cleveland, Morleys Corners, Elyria, Oberlin, Wakeman, Norwalk, Monroeville, Bellevue, Clyde, Fremont, Woodville, Lemoyne, Toledo, Wauseon, Archbold, Bryan, Edgerton, Butler, Kendallville, Wawaka, Ligonier, Benton, Goshen, Elkhart, Mishawaka, South Bend.

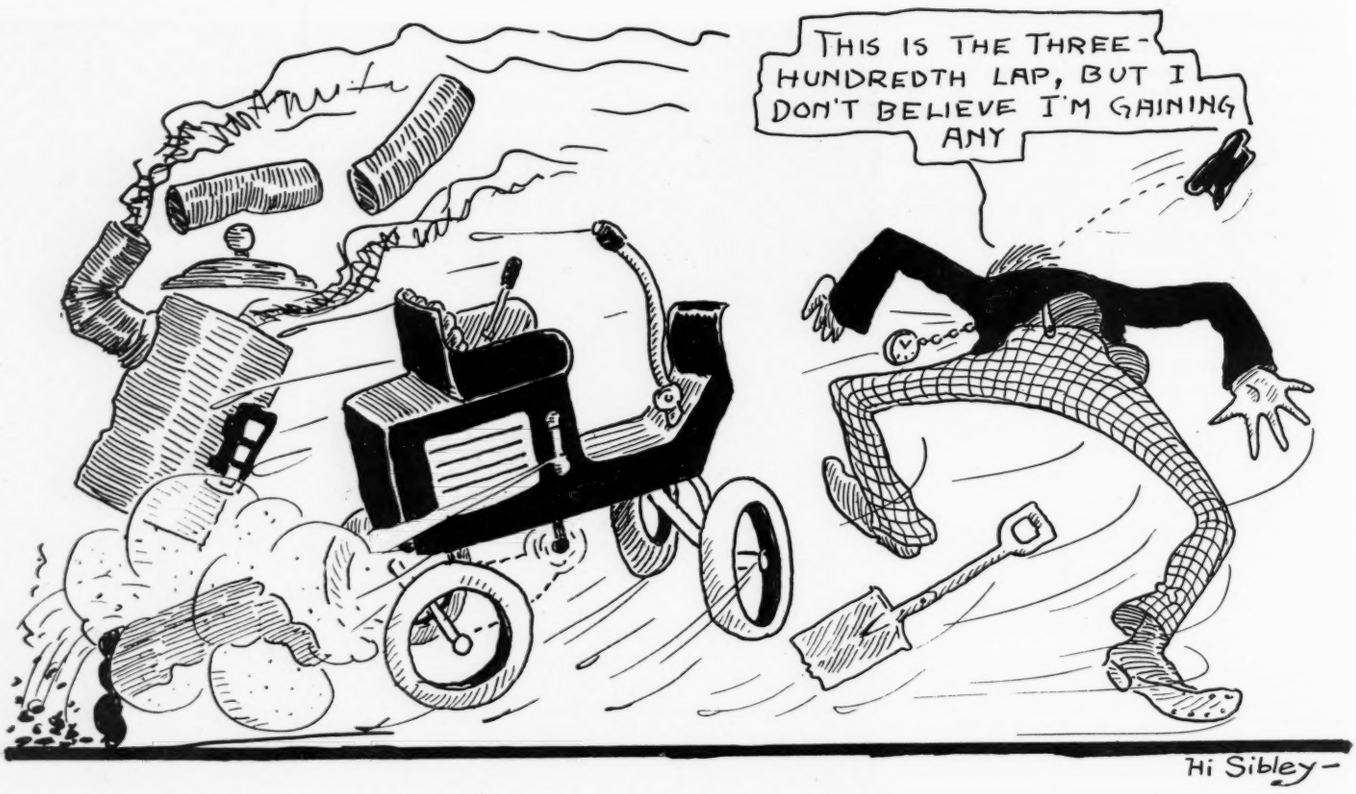
Vols. 2 and 4 of the Automobile Blue Books contain complete running directions.

Mount Whitney—14,502 ft.—highest mountain exact center of picture. Altitude at car 3700 ft.



Scene in Yosemite Park. Glacier Point—3250 ft. vertical height above floor of valley, one of the attractions on the Midland-Yosemite route

In Yosemite National Park. View from Dana Meadows on the Midland trail—Yosemite route, looking toward Bloody Canyon. Altitude, 9500 ft.



Tales of the Alley Rats—No. 2

The Mad Mobile

By Hi Sibley

THIS is the second of a series of articles based on the stories told by Captain Manlove A. Shuey, or Cap., as he is more often known, a pioneer dealer whose tales are of the early days when a dealer's life was very extraordinary indeed. The first of the series was "The Fire-Proof Captain," and the next, to be published in an early issue, will be "The Perennial Prospect."

SUNDAY afternoon or evening is the most propitious time to visit the Alley Rats' nest, for Cap Shuey, proprietor of that little garage, conscientiously adheres to an unwritten law that no business is to be discussed on Sunday. Therefore, this genial raconteur is free to devote his entire time to the entertainment of his guests, whom it pleases him to call Alley Rats. And all who have been fortunate enough to pass a Sunday afternoon in this little alley rendezvous agree that such wholesome diversion keeps them in a good humor for the rest of the week, those with torpid livers included.

Week days are slightly different. If Cap is unoccupied, all well and good, but he is ever on the alert for business. If an Alley Rat or a stranger saunters in with a new overcoat or a 10-cent cigar, or bearing other unmistakable evidence of prosperity, Cap's agile mind instantly leaps into action. He edges over to the prosperous looking individual, steers him to a shiny new T-A-D car, simultaneously explaining in low confidential tones all its fine points, beginning with the design of the radiator and never letting up until he reaches the rear spring shackle.

On this particular Sunday every chair and settee in the semi-circle around the old stove was filled, while others roosted like a row of turkeys on the running boards of cars adjacent. It was an auspicious occasion, and Cap was in high spirits. He needed but a suggestion to unlimber his ever willing vocal machinery. Presently his opportunity came when Alec Staples, gray haired veteran of '61 and lifelong friend of Cap's, mentioned the furor the first car in town had created.

"Did make 'em sit up some, didn't it?" said Cap. "Folks used to walk along the street backwards just to watch me when I passed in my first Mobile runabout. And they would say, 'Ain't that grand; just sit there and glide along, and no horses to shed hair all over you, and nothing to worry about but ride?'

"But," Cap continued, preparing himself for the long pull ahead with a generous pinch of Fast Mail, and backing up to the stove that he might better face his audience, "they never knowed what cantankerous little devils them steamers could be when they took the bit in their teeth once. Why, one of them actually tried to chase me out of my own gerridge."

Knowing that he needed no urging, once he had launched upon his subject, his listeners settled back in their seats with eager anticipation.

"It was when I had my first gerridge over in back of Hobb's furniture store. It was a two-story frame building and my showroom was about half the size of this. Only had one car for demonstration then, and it was a great curiosity, boys—a great curiosity. Guess everybody in town came to see that wagon the second day I had it, and I had to lock the doors to keep 'em out.

"I'd been out showing Rudy Kamm how to operate it one afternoon and came back into the gerridge with a full head of steam. Just got the car turned around in there and backed up at the end of the room when Tim Lorden—you remember Tim Lorden, Alec; he was my engineer on the 'Ben Hamilton'—when Tim Lorden came apokin' in.

"Tim was a good-natured old soul; I thought a lot of Tim, but he just couldn't keep his nands off'n nothin', boys—couldn't keep his hands off nothin', 'specially any new-fangled machinery. Well, I was shakin' the stove (Cap's favorite diversion) and not payin' much attention to Tim, who was back inspectin' the car.

"Then all of a sudden something shot past me like a doorknob out of a shotgun, and there was a crash and the thing started back again and then I see it was the car. Tim had got to monkeyin' with the levers and had pushed the throttle wide open, and as soon as he done that, of course, with 600 lb. of steam that little wagon started to travel.

"Things was right lively after that. Tim shot out through the window, takin' the sash with him. I ducked out from behind the stove just as the stove went down and the wagon kept right on over it. The

250 Meals at 20 M. P. H.

An Army Kitchen That Dismounts from Chassis

wheels got cramped just so's the car would turn around in the room—once in a while it would bump the wall and knock all the plasterin' off, and cramp the wheels again and keep right on agoin'.

"I tried to catch it, but every time I got near enough to grab the throttle it dodged and started to turn around the other way—why, it was just like trying to grab an old Tom cat that was in a hurry to get somewhere else!

"It kept goin' around and round, and me gittin' gray haired trying to keep out of its way, and coals was all over the floor and the floor was afire, and all the windows was smashed, and a woman upstairs got so excited she jumped out of the window and landed on a peddler's horse that ran away and smashed through the window of a chandelier store acrost the street.

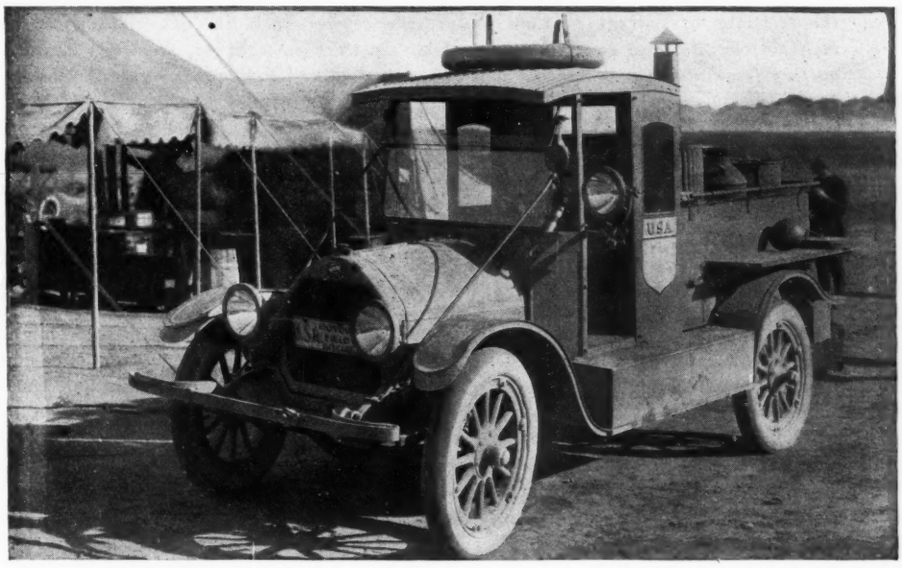
"I never knowed how much damage 600 lb. of steam in a little buggy that wa'nt no more'n that long (indicating with his hands) could do, but it was a plenty.

"Bimeby steam got so low that I could catch up with it, and I shut her off in a hurry, I'm tellin' you, and from force of habit I kicked her a couple of good ones in the ribs. By this time the hose wagon had arrived and the constable and the street outside was jammed.

"Figurin' it up, after I got my breath, I had run 9 miles tryin' to get away from that crittur, and my place was ruined and I lost a customer. Rudy Kamm heard about it, and when I come around to talk business serious with him, he just laffed at me. And that's the time I began to look up a gas car to handle, because they were beginning to come in then. You can learn a gas car something."

TO USE BOSTON FORD PLANT

Boston, Oct. 5—Despite reports to the contrary, the Ford assembling plant in Cambridge will be used by the Government. The problem of taking care of the employees has been solved by transferring the workers from the plant to other Ford factories. The plant is to be operated on a larger scale after the war. The New England trade will be cared for from other plants until other arrangements can be made.



HERE we have an army motor kitchen that can cook 250 meals at one time and operates equally as well on the march when traveling 20 m.p.h. as when at a standstill. It consists of a regular army kitchen outfit mounted on an Overland commercial chassis, equipped with two 20-gal. soup and coffee boilers, four 10-gal. reserve hot food retainers; two large ovens for roasting and baking purposes, pans for frying and a complete set of cook's tools.

The kitchen is a part of an army cooking outfit which is completed by two Overland delivery wagons with special army bodies of the prairie-schooner type and one Overland five-passenger touring car. The caravan, as it might be called, made a trial trip from Toledo, Ohio, to Washington, D. C., for inspection by the Federal authorities there. Captain F. H. Buzzacott was in charge and made demonstrations in Chicago and Toledo, pictures of which are reproduced here.

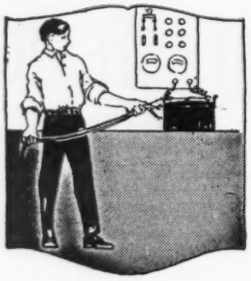
Space is provided on the kitchen truck for extra fuel and rations enough for one complete food renewal. The capacity of 250 meals is not affected by camping conditions, that is, can be maintained on the march as well as at fixed camp. The cooking apparatus can be removed by unscrewing four bolts and placed on the ground so that the chasis can be used for other purposes while the troops are in camp. The amount of fuel required for 250 men is 18 lbs. of wood or 12 lbs. of soft coal. The delivery wagons included in the kitchen outfit are fitted with special tops similar to the regular khaki tops used on standard army trucks.

ARMY REGULATES CAMP TRAFFIC

Louisville, Ky., Oct. 5—Acting under instructions from the division commander, Col. Charles F. Crain, Provost Marshal, has given orders to the guards to enforce traffic regulations at Camp Zachary Taylor. Motor cars used for passenger purposes will be limited to 15 m.p.h. and motor trucks and other vehicles to 12 m.p.h. while within the reservation.

SIBLEY WITH REPUBLIC TRUCK

Alma, Mich., Oct. 6—Hi Sibley, who has been special representative for MOTOR AGE in Europe, on the Mexican border and in Japan, is now publicity manager for the Republic Motor Truck Co. The initial issue of *The Republic Radio* marks his appointment. Human interest such as Mr. Sibley incorporated in his various articles in this publication appear in the *Radio*, terms of subscription to which are given as "Your Good Will."



Electrical Equipment of the Motor Car

By David Penn Moreton & Darwin S. Hatch.

Editor's Note—Herewith is presented the sixty-fourth installment of a weekly series of articles begun in MOTOR AGE *issue of June 29, 1916, designed to give the motorist the knowledge necessary to enable him to care for and repair any and all of the electrical features of his car, no matter what make or model it may be. At the conclusion of this series, "Electrical Equipment of the Motor Car," with additions, will be published in book form by the U. P. C. Book Co., Inc., New York, in a size to fit the pocket conveniently.*

The fundamentals of electrical circuits of the motor car were explained through their analogy to water systems, and the relations of current pressure and resistance were brought out. This was followed by an explanation of series and multiple circuits, how electricity is made to do work in lighting, starting, signalling, etc. Calculating the capacity of a battery for starting and lighting and the cost of charging storage batteries and determining the torque a starting motor must develop were explained. Action of primary batteries and dry cells was considered. A section was devoted to the makeup and action of lead and Edison storage batteries, and another to the care of lead batteries in service and the best methods of charging them. Magnets and electromagnetism then were considered, and the principles of generators and motors explained. A section on generator output was followed by one on the purpose and operation of the cutout. Electric motors and engine and motor connections then were considered. Ignition was taken up next.

Part LXIV—Battery Ignition Systems

THE Remy system operates on the closed-circuit principle, and it is distinguished by the fact that it has but two moving parts—the cam and the breaker arm. The complete system is shown in Fig. 352. The breaker mechanism is shown in Fig. 353. The rotation of the cam C brings its corners in contact with a fiber plug which is riveted to the breaker arm. The arm thus is lifted, separating the contacts. Only hand advance of the breaker mechanism is provided.

Another particular feature of the Remy unit is that the whole mechanism is stationary. Advancing or retarding the spark does not move any of the wiring. This is accomplished by mounting the breaker mechanism on a plate. This plate is attached to the advance lever and is moved with it, thus rotating the breaker mechanism partly around the cam.

The distributor mechanism consists of the usual Bakelite oven, with terminals molded in place. There are no wiping contacts, the spark jumping from the radial distributor arm to the terminals and thus eliminating wear.

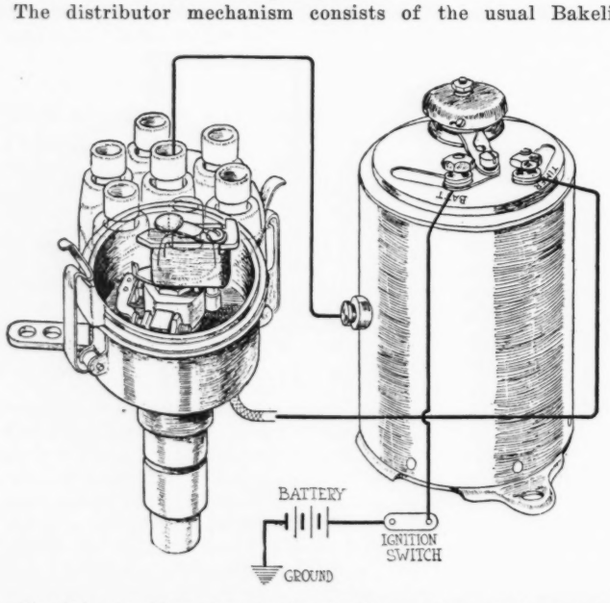


Fig. 352—Complete Remy battery ignition system, which operates on the closed-circuit principle

A small resistance coil is located on top of the ignition coil and is connected in series with the primary winding. The object of this resistance is to protect the winding and at the same time prevent an excessive drain on the battery should the engine be left idle for any length of time with the ignition switch closed. The protection is provided by the resistance of the coil increasing very rapidly when the current through it exceeds a certain value or, what amounts to the same thing, when its temperature exceeds a certain value, thus causing the resistance to increase very rapidly.

The makers claim that the contact points, which are iridium-platinum, or tungsten, should not require attention more than twice a season. These contacts should be dressed with a fine flat file so that surfaces will be smooth and parallel, and they should be adjusted with the wrench provided by the makers so that the maximum opening is from 0.020 to 0.025 in. or the thickness of the gage piece riveted to the wrench.

If the engine misses when running idle or at light loads the gaps at the plugs should be wider. If the engine misses when running at high speeds or when pulling hard the gaps should be narrower.

The oiler on the shaft should be kept filled with medium cup grease and screwed down two or three turns ocasionally. On some of the devices a wick oiler is used, and in such cases pure vaseline should be used instead of the cup grease. The complete combined breaker and distributor of the Remy company is shown in Fig. 354.

Rhoades System

The Rhoades system operates on the open-circuit principle, and in its new form it has been amplified considerably, though the principle remains unaltered. The couple system is shown in Fig. 355 and consists of the combined breaker and distributor unit and a combined coil and switch unit.

The breaker portion of the breaker distributor unit is shown, as seen from the top, in Fig. 356. The cam C is mounted loosely

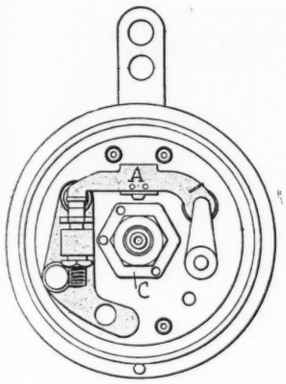


Fig. 353—Breaker mechanism of Remy

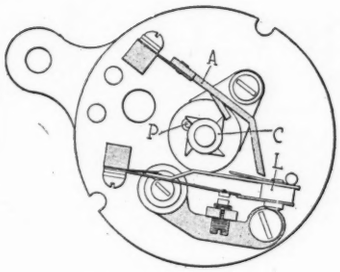


Fig. 356—Breaker mechanism of Rhoades system

on the shaft and rotates with it by contact with the pin P, which is rigid, so far as rotation is concerned, with respect to the shaft. As the cam C rotates it presses the arm A outward, and this arm in plunging back, hits against the lever L, thus forcing the contact together momentarily.

If the cam is rotated in the reverse direction it simply rides over the pin and does not bring the contact together. The contacts, it must be remembered, are brought into contact solely by the momentum of the arm A, and for this reason the duration of contact remains the same, regardless of engine speed. The characteristics of the spark then should be the same for all engine speeds.

The distributor is the usual Bakelite construction with brass terminals molded in place. The distributor arm is keyed to the shaft with a set screw, and the construction is such that it cannot be assembled improperly. The distributor arm does not make contact with the terminals, but the spark jumps a small air gap.

There is only one adjustment to make on the device and that is to regulate the distance between the contacts. They should be about $\frac{1}{32}$ in. apart at all times. Since the action of the device

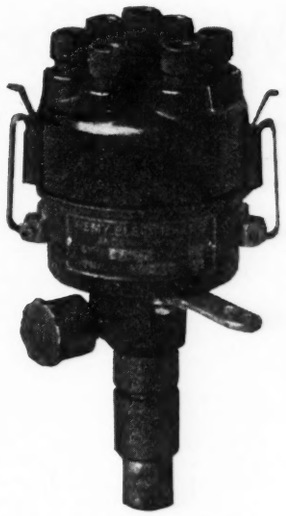


Fig. 354 — Combined breaker and distributor of Remy battery ignition system

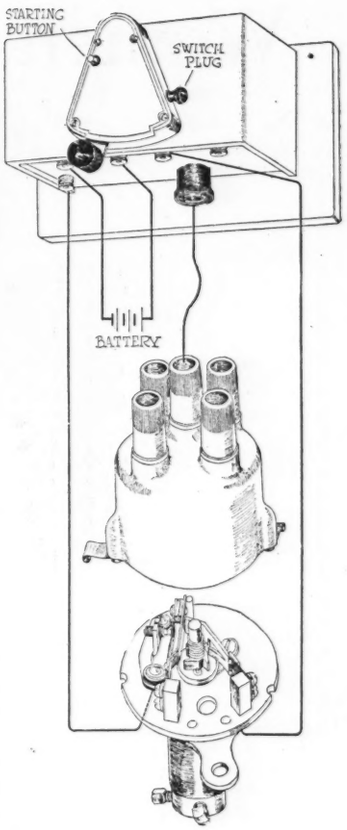


Fig. 355 — Complete Rhoades battery ignition system, which is compact and simple

is entirely too rapid to be seen, care must be taken that each of the parts is functioning properly.

There is a single oil cup on the distributor and this should receive a drop of light machine oil twice a week for continuous driving. From time to time the cover should be removed, and if the cam appears dry, a very small quantity of thin oil may be put on it. Under no circumstances should the tension of the various springs be altered at all.

A. B. C. of Aviation

(*Concluded from page 23*)

truss, Fig. 18, in which the number and length of exposed members are minimized. The construction is adapted especially to the fast small-span racing or scouting machine. A strutless truss as a combination of two pairs of monoplane wings with the usual bracing, Fig. 19, is imaginable, but the advantages of such a construction are doubtful. Another form of strutless truss, Fig. 20, is much more promising and with the appearance on the market of wires having streamline sections it is possible that the structural resistance can be reduced even further than is the case with the wireless truss. Fig. 21 shows that this construction also can be well adapted to the overhang type of biplane.

The trusses in a triplane can be treated along the same principles as in the biplane truss. In several instances the problem has been treated incorrectly as shown in Fig. 22. Here the full height of the truss is not utilized, although it would increase the strength of the truss about four times. Figs. 23 and 24 show examples of correct treamtent. Fig. 25 shows a more complicated form of biplane truss for large high-powered machines.

75,000 See California Tractor Demonstration

LOS ANGELES, Oct. 5—More than 75,000 persons attended the second annual demonstration of tractors here recently. The exhibition was under the auspices of the Traction Engine & Implement Dealers' Association of Southern California, and approximately forty different models of tractors were on display. From the standpoints of attendance and sales, exhibitors say the demonstration surpassed anything of the kind ever held in the West.

The Vail ranch, where the event was held, contains 650 acres, so there was room for all. About twenty-five tents were scattered about the grounds, and in the main exhibit tent there was almost everything from music boxes and refrigerators to 5-ton trucks. About every variety of farm implement was on display, and demonstrations of household efficiency were made for the women, who attended in comparatively small numbers. Some young women were employed as tractor drivers during the plowing exhibitions, adding to the interest.

The demonstration was limited almost solely to plowing. Salesmen had photographs of other lines of work being done by tractors, but no display of the diversified uses of the tractor was made. Distillate was used almost exclusively. Kerosene is only about ½ cent a gallon cheaper than distillate in California and not as satisfactory.

Included among the exhibitors were:

International Harvester Co., W. L. Cleveland Co., William Gregory & Sons, Samson Sales Co., Smith Form-a-Truck Sales Co., California Moline Plow Co., California Implement Co., Dauch Mfg. Co., Holt Mfg. Co., C. S. Anthony, Bean Spray Pump Co., C. L. Best Gas Traction Co., L. A. Auto Tractor Co., Arnott & Co., E. P. Bosbyshell Co., Dixon & Griswold, A. F. George Co., Killefer Mfg. Co., Freedlund Co., Hughson & Merton, Union Tool Co., Owen Magnetic Sales Corp., Lichtenberger-Ferguson Co., Cambria Springs Co., Weinstock-Nichols Co., California Readycut Bungalow Co., Fairbanks-Morse Co., Standard Oil Co., Valvoline Oil Co., Pacific Auto Sales Co., Whiting-Mead Co., Nelson-Price Co., Keaton Tire Co., Oldsmobile Co. of California, Republic Motor Truck Co., M. S. Bulkley & Co., Studebaker Corp., Panama Lubricating Oil Co., Splitdorf Electrical Co., International Mack Corp., Pearl Motor Car Co., Duke's Oil Engine & Distillate Co., United Motors Co., Four-Wheel-Drive Truck Co., Warren Oil Co., Damon Specialty Co., Denby Truck Co., Troy Motor Co., Ensign Carbureter Co., L. M. Davenport Co., Savage Rubber Co., Johnson & Howe, Pacific Rubber Co.

Women Who Motor Cross Country and How They Do It

British women at the front running to their ambulances when a train is signalled and they are expecting wounded soldiers on the train

WAR time has done much to make the woman more of a factor in driving the car. The young man of the family is in war business now, either that of fighting or that of helping keep industry going. The woman has taken his place to a large extent. She drives the car on its errands, acts as chauffeur extraordinary for other members of the family and proves the pilot on more and more of the cross-country tours.

Mrs. F. Leavenworth-Huston, Clear Lake, Iowa, has had varied experiences with her motor car and recently completed a trip from San Diego to Clear Lake. Just what kind of a trip she had you can see for yourself from her letter, which says:

Camping Outfit

"I am going to tell you something of my trip from San Diego to Clear Lake, Iowa, in my Maxwell car. There were four of us in the party, and we camped out nights all the way. We had a large box built to stand on the running board of the left hand side of the car, the top of the box coming up even with the top of the body of the car, and the front let down to form a table.

"We carried four folding army cots and we left the cushions of our car home, and I made canvas covers just the shape of our cushions, and in those we carried our bedding. It took us nineteen days to make the trip, and we rolled up 2669 miles, used 133 gal. of gasoline and 2½ gal. of oil.

"We found very bad roads in many places but our sturdy Maxwell never refused to pull at any time. We had dreadfully hot weather and lots of sand in the desert. We had been passing and repassing five machines from California, and one night we camped together. The next day we struck a long stretch of sand, and two of the other cars were stuck.

"We had very steep and narrow grades in many places. Some grades were 20 per cent and lots of sharp turns. Several were so sharp we could see where large cars had scraped the banks. We had 100 miles of mud and got caught in a hard rain.

"We had roads, too, that were so steep and rocky that they were like climbing stairs, only worse. We came over the National Old Trails road to Denver. We drove into Grand Canyon and through the Petrified Forest, and when we reached Colorado Springs we went over to Manitou to Pike's Peak.

"Two years ago we drove into the Yosemite valley, and I was the first woman to drive in or out—we had lots of 35 per cent grades and for 41 miles I could not get out of low gear."

Mrs. V. A. Humphrey of Los Angeles, Cal., has solved the problem of how to carry several changes of clothes, spotless, perfectly creased, without wrinkle and so on, while on a vacation tour across the continent in a motor car. She solved it by a khaki bag 3 ft. wide and 3½ ft. long, which opens full length like a jack-knife and buttons all the way across with glove fasteners. In the top is sewed a curtain pole, which has two straps to suspend the bag from the top bow in the rear of the car.

The rod carries three hooks, from which are hung regulation coat and skirt hangers, permitting from three to six suits to hang vertically in the bag, free from dust, rumple and wrinkle as they would be in a clothes press at home.

Another aid-to-comfort in Mrs. Humphery's car, which is a Studebaker, is a full-length suspension-bridge upper berth slung crosswise in the car just above the tops of the seats, leaving the tonneau and back seat for a dressing room for the occupants. A 10 by 18 khaki tarpaulin spiked at the four corners serves as a wrapper for the bedding on the running board during the day, while at night the tarpaulin covers the car fore and aft, making the sleeping quarters cozy and snug.

Why the U. S. Is Fighting Waste—No. 3

A Slice of Bread

A single slice of bread seems an unimportant thing. In many households one or more slices of bread daily are thrown away and not used for human food. Sometimes stale quarter, or half, loaves are thrown out.

Yet one good-sized slice of bread—such as a child likes to cut—weighs an ounce. It contains almost ¾ oz. of flour.

If every one of the country's 20,000,000 homes wastes on the average only one such slice of bread a day, the country is throwing away daily over 14,000,000 oz. of flour, more than 875,000 lb., or enough flour for more than 1,000,000 1-lb. loaves a day. For a full year at this rate there would be a waste of more than 319,000,000 lb. of flour—1,500,000 bbl.—enough flour to make 365,000,000 loaves.

As it takes 4½ bu. of wheat to make a barrel of ordinary flour, this waste would represent the flour from over 7,000,000 bu. of wheat.

Fourteen and nine-tenths bushels of wheat on the average are raised per acre. It would take the fruit of some 470,000 acres just to provide a single slice of bread to be wasted daily in every home.

To produce this much flour calls for an army of farmers, railway men, flour-mill people. To get the flour to the consumer calls for many freight cars and the use of many tons of coal.

But, some one says, a full slice of bread is not wasted in every home. Very well—make it a daily slice for every four or every ten or every thirty homes—make it a weekly or monthly slice in every home—or make the wasted slice thinner. The waste of flour involved is still appalling—altogether too great to be tolerated when wheat is scarce.

Any waste of bread is inexcusable when there are so many ways of using stale bread to cook delicious dishes.

The Motor Car Repair Shop

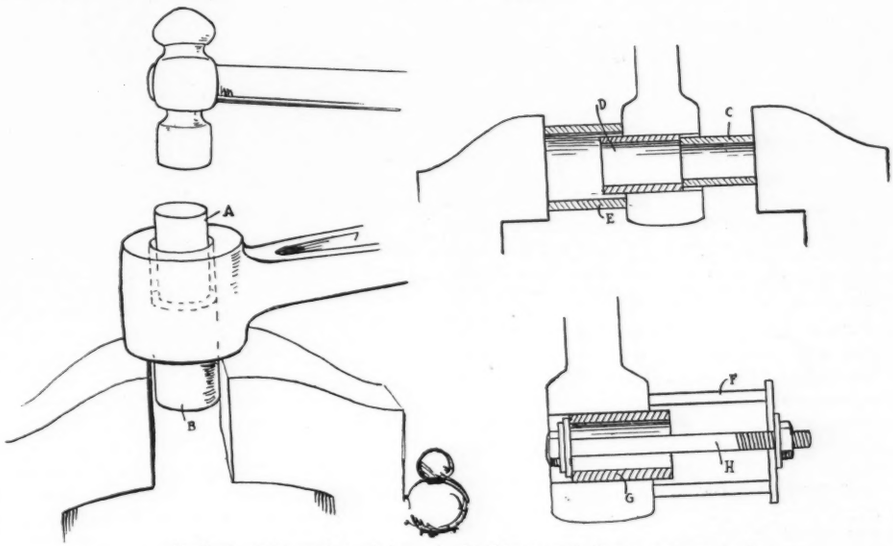
Removing Piston Pin Bushings

PISTON pin bushings are usually made of bronze and eventually need replacing when worn to such an extent that the engine knocks. Piston pin wear can be determined by short-circuiting the plug of the suspected cylinder when the engine is running. If there is a distinct tapping, it is quite likely that the bushing and pin are worn. Most of the piston ends of connecting rods are not made adjustable, so the bushing has to be forced out.

The tools needed for the work are a hammer, wrench, reamer, vise, several short lengths of pipe, block of wood and a bolt fitted with large washers and nut. If a new bushing is fitted it will be well to fit also a new pin, because the latter is probably out of round. A worn pin can be trued up by grinding, but the trouble is that the grinder is apt to bite into the softer metal under the case-hardened portion making the pin short lived. The illustration shows three ways of removing bushings and one of these can be used advantageously in most cases.

The simplest way is to open the jaws of a vise just enough so that the end of the connecting rod will rest upon them, at the same time giving enough clearance for the bushing, B, to pass between them as it is driven out. The latter is removed by placing against it a drift, A, made from a piece of pipe or tubing, striking it a few blows with a hammer. If tubing is used for A, a wooden block is placed on top of it to take the hammer blows.

A better way is to use a vise in connection with two short pieces of pipe or tubing. Enormous pressure is exerted between the jaws of a large vise when it is turned up and the pressure is better distributed than when a hammer is used. With this method the pipe or tube, E, is placed against one of the jaws and the drift, C, against the bushing and opposite jaw. Pipe E should have an inside diameter a little larger than the outside diameter of D. When the jaws are brought together, the bushing will be forced into the pipe E.

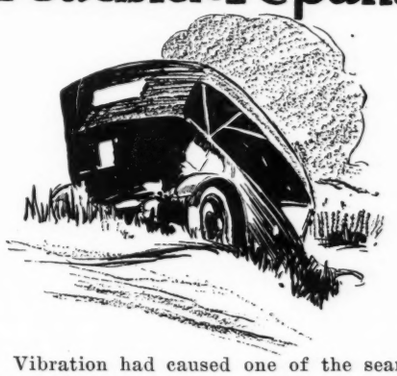


Method of removing piston pin bushings and the necessary tools

Thus hammer blows are done away with and there is no danger of marring the metal.

If a vise is not at hand there is still a way to remove the bushing by the use of a bolt. Place a piece of pipe F against the face of the connecting rod and fit the bolt H as shown. A piece of metal is placed on the outside of the pipe F for the washers and nut of the bolt to work against. A large washer is put over the end of the bushing G and when the nut is turned to the right with a wrench, the bolt will be drawn toward it and as the washer under the head rests against the bushing, the latter will be squeezed into the pipe F.

Roadside Repairs



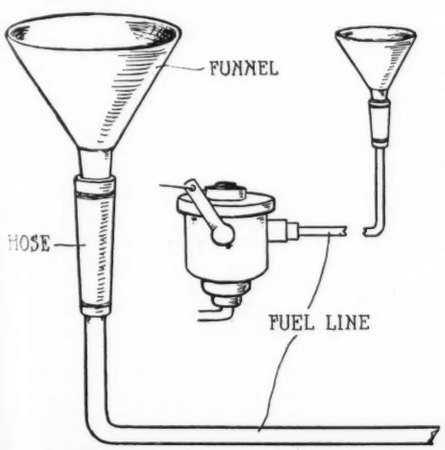
Vibration had caused one of the seams in a cowl tank to open resulting in a bad leak. Immediate soldering of the joint was out of the question, but a temporary fuel feed was installed as follows:

1—The remaining fuel was drained into a 5-gal. can borrowed from a farmer.

2—The feed pipe after tank coupling had been removed was bent so it protruded in front of the dash in the driver's compartment.

3—A small funnel was connected to the end of the pipe with a short length of rubber tubing cut from the tire pump and wired in place.

4—The front seat passenger poured gasoline into the funnel from a 1-gal. can and kept the carbureter supplied until the car reached home where the leak was soldered.



Temporary fuel feed for cowl tank

Soldering Hints

Frequently the car owner or repair man is advised to carry out a soldering job and unless he is familiar with the work, trouble is sure to follow. Soldering does not mean merely to heat the copper, apply flux and then melt the solder on the joint.

Although generally spoken of as a soldering iron, the latter is in reality made of copper because this metal absorbs heat readily and gives it off again when brought into contact with other metals. In order that the solder might be distributed evenly over the surfaces it is essential that the soldering iron be well tinned. A good addition for a soldering outfit for cleaning irons is a piece of fluorite or flur spar. This is an excellent flux and after an iron has been cleaned and heated, and then rubbed on a piece of flur spar the tin or solder will spread readily thereon and adhere to it.

No satisfactory work can be done with an iron that is too cold, as the solder will pile up in ugly lumps. When properly heated solder will flow like water and as soon as it starts to build up, the iron should be placed in the fire again or a freshly heated one used. Too much heat will spoil the iron; crustations will form on the end of it which make the copper appear as though it were acid-eaten. Such an iron will have to be renewed by filing the surfaces flat and retinning.

The Readers' Clearing House

The Electric System

Gray & Davis Wiring on Ford

Q.—Publish wiring diagram of the two-unit Gray & Davis system used on the Ford. It is the one with the double chain and over-running clutch, motor type Y., dynamo type T.—R. R. Bascom, Columbus, Ohio.

A diagram showing the Gray & Davis wiring system for the Ford car is shown in Fig. 2.

Ignition Too Late on 1914 Vulcan

Q.—The spark on my Vulcan car, 1914, seems to take place too late. Can you tell me how to check up the timing to see if it is correct or not? It is equipped with Type B, No. 230 Westinghouse ignition and lighting generator.—S. W. Alter, Forest, Ohio.

When the ignition is set too late the engine will overheat. When it is set too early the engine will knock. Generally the power increases with an advance in the spark and the spark should be advanced as much as possible without producing a noticeable knock.

Testing for Shorts in Armatures

Q.—Explain a satisfactory method of testing an armature to see if it is in good working order. I have tested these with a battery, but do not seem to get good results, as one recently tested in this manner showed "no short" but would not work when up in the generator.—Frank S. Pohanka, Washington, D. C.

The only sure test for short-circuits in the armature winding is to disconnect all the leads from the commutator and then ring out the armature. This test consists in placing one test point of a testing magneto on the lead of one armature coil and the other test point on the lead of an adjacent coil. If the bell rings when the magneto is turned there is a short between the two coils. Test this way all around the armature. Instead of the magneto tester a lamp tester may be used.

Another way not as reliable to locate a short circuit in an armature consists in operating the machine for a while either as a generator or a motor and then feel the different armature coils where they emerge from the core. If a section is short-circuited it will usually be considerably hotter than the rest of the coils.

If a generator fails to generate or to pick up it is much more likely to be due to poor

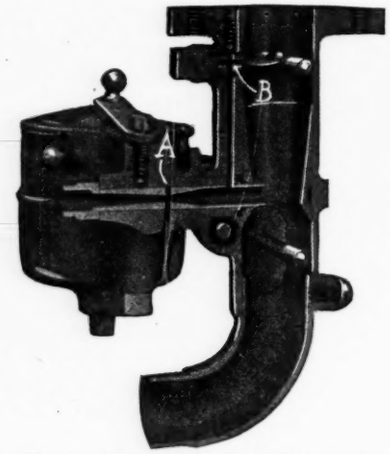


Fig. 1—Adjustments on Zephyr carbureter, the atomizer and the throttling jet

contact of the brushes on the commutator or of the brushes on the brush holder than to a short-circuit in the armature.

Charging 12-Volt Battery

Q.—Publish diagram showing how to charge a 12-volt battery with a small direct current generator developing 4½ amp., 115 volts.—J. R. Fournier, Ochelata, Okla.

The diagram of connections is shown in Fig. 3. Use nine 16 cp. carbon filament lamps. If the generator is used for house lighting so that the house lamps can be used for charging all you have to do is to remove one of the wires from the main switch and connect the battery between the wire and the switch. The battery is connected right when the lamps burn slightly dim.

Engines

Assembling Paige 25 Engine

Q.—How can I assemble a Paige 25 four-cylinder engine? This engine is completely disassembled at present on account of broken camshaft and crankcase.—Robert King, River Rouge, Mich.

The steps in assembling an engine are as follows:

1—Assemble pistons, piston pins and connecting rods.

2—Turn engine block upside down and drop pistons and rods into the proper cylinders.

3—With engine still upside down fit crankshaft to the main bearings and put on caps.

4—Connect lower rod bearings to cranks and put on caps.

5—Put on camshaft.

6—Assemble timing gears, placing the center punched teeth of the gears together.

7—Bolt on crankcase.

8—Turn engine block right side up and fit valve tappets, push rods, push rod guides, and other valve parts.

9—Drop valves into cylinder.

10—Put on flywheel and other exterior parts of the engine.

Pressure on Piston During Explosion

Q.—In the average passenger car engine, what is the theoretical pressure per square inch that is exerted on the piston at the moment of the explosion, when the piston is half way down the stroke, and when the piston is at the bottom of the stroke?

2—If the same pressure were exerted on the piston all the way down, that is, exerted at the moment of explosion, what would be the theoretical increase in horsepower?

3—If an engine is altered so that it will take in, say, twice as much explosive mixture, the combustion chamber being increased so that pre-ignition will not take place, will this engine develop twice as much horsepower as at first or before it was altered?

4—Generally speaking—not taking into consideration the finer points of engine design, balanced crankshaft, light reciprocating parts, etc.—is the horsepower of an engine proportional to the amount of explosive mixture that is ignited in the cylinders?—C. G. Mentzer, Harvey, Ill.

1—The approximate explosion pressure under full throttle is 350 lb. per square inch. At half stroke it is about 90 lb. per square inch and at the end of the stroke it may be down to 10 lb., if the valves open 45 deg. from bottom center.

2—The engine would give from four to five times as much power.

3—Not twice as much but from 50 to 75 per cent more.

4—Yes, if the engine cycles are the same.

Closing Throttle Suddenly

Q.—In reply to C. N. Douglas, of Salt Lake City, you state that crankshafts can be sprung by driving fast and stopping suddenly by applying the brakes, and not throwing out the clutch properly. I should like to ask if you think this would be likely to happen if one were to drive, say 40 m.p.h., then suddenly close the throttle, leaving the clutch engaged, but using no brakes.—Herbert A. Trask, Concord, N. H.

There is no danger of springing the crankshaft by a sudden closing of the throttle, inasmuch as the engine, although slowing down, will continue to drive the rear axle without being hindered by applying the brakes. When the brakes are suddenly applied without throwing out the clutch, something is bound to give, because the engine cannot propel the car when at the same time a force is tending to keep the rear wheels from turning. Hence the crankshaft generally suffers.

Hard to Shift from First to Second

Q.—My Chalmers Master Six, model 24, 1914, gives some trouble in placing it in first and second speed from neutral. The whole clutch spins and the disks do not seem to separate rapidly enough. The result is that the car cannot be started without clashing of the gears. On the

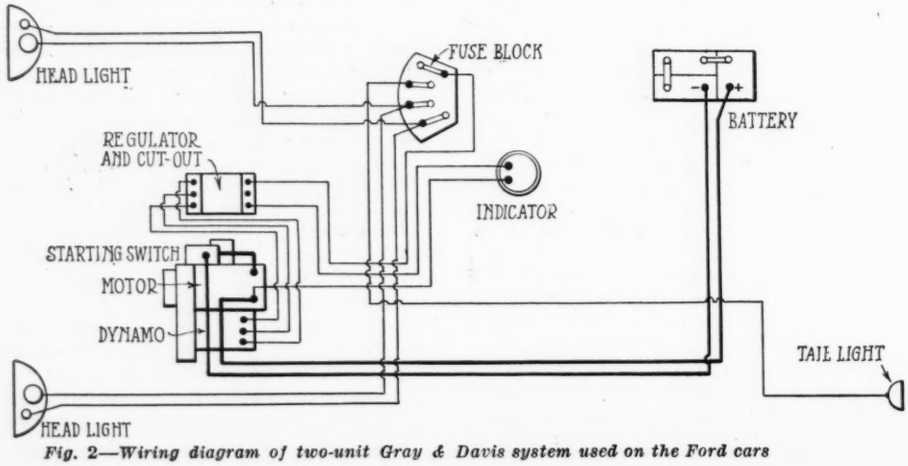


Fig. 2—Wiring diagram of two-unit Gray & Davis system used on the Ford cars

clutch yoke is a leather facing acting as a brake, but it does not seem sufficient to reduce or stop the spinning of the plates attached to the transmission. Could you suggest any other material than leather for this yoke which would cause more efficient braking? Or another remedy? The trouble is in shifting from first to second.—Albert Mohn, Red Wing, Minn.

The probable cause of your trouble is that the clutch is dirty and there is a very good chance that a thorough cleaning out with kerosene oil would separate the disks. The disks in a clutch of this type become very sticky from gummed oil after they have been run for a long time without cleaning.

Your suggestion for supplying another material than leather for the clutch brake is a good way to get around the trouble if it is not from dirty plates. If you will purchase a small piece of some well-known asbestos fabric material, the braking effect will be greater than is given with leather.

Engine Runs on Two Cylinders

Q.—Explain the following trouble with a 1916 Maxwell: The car came in running on the two middle cylinders; the driver says it had been running fine and that the car was in operation at the time the trouble commenced. Cylinders two and three would not fire at all, one and four seemed to be in good condition, all cables were taut and no insulation off anywhere; the distributor connections were O. K.

The breaker box was in good condition, breaker points smooth and flat, the break was perfect, but in no way could the firing of two and three be improved. All brushes and springs were in good shape and tested out with bell magneto showing good contact in every respect. Then one of the brushes in the breaker box was left out, with no improvement; then the other brush was removed and the first one replaced. The machine then worked fine with the exception that it seems to get hotter than it did before. If the car will work well with only one brush, why put in two?—Hugh C. Russell, Keams Canon, Ariz.

Electric troubles of this nature are hard to define, when it is impossible to go over the car, from the data which you supply. There is a short-circuit between the two brushes you mention when the commutator is located in certain positions, these positions being such that the cylinders two and three are ready to fire. When you remove one of the brushes you naturally remove the cause of the short-circuit and the engine will fire. This seems to be the only explanation that is possible from the data you have given, and we would recommend that you check over the commutator to see if this short-circuit does not exist.

Carburetion

Adjusting Zephyr Carbureter

Q.—How is the Zephyr carbureter on the Vulcan 1914 car, adjusted? The present mixture is too lean.—S. W. Alter, Forest, Ohio.

There are two adjustments on this carbureter, one for low and the other for high engine speeds. The former is controlled by the throttling jet B shown in Fig. 1 and the other by A, which is called the atomizer. Both of these adjusting devices are fitted with a squared end marked 1, 2, 3, 4. These figures correspond to four small holes drilled in the barrel and when the atomizer, for instance, is placed so that figure 1 is up it means that the smallest hole is coincident with the spraying jet on the inside of the carbureter. If a richer mixture is desired, the atomizer is turned so that either the figures 2, 3 or 4 are up. The throttling jet has nothing to do with the richness of the mixture; it merely furnishes enough gas for the engine to idle properly, or run at low speeds. The outlet of the throttling jet, as will be noted in the sectional view, is above the throttle valve, so that if the latter is completely closed, there still will be enough mixture going to the manifold so the engine will not stall. The idling speed is controlled by turning the jet so that one of the holes will be in line with the auxiliary nozzle. The engine will run fastest with No. 4 up on the throttling jet. The atomizer and throttling jet need not necessarily be placed so that the same figure is up in each. If the mixture is still too lean when No. 4 is up on the atomizer, you need an atomizer in which the holes are a little larger. With care the holes in the present one can be enlarged slightly by using a pin with a mixture of powdered glass.

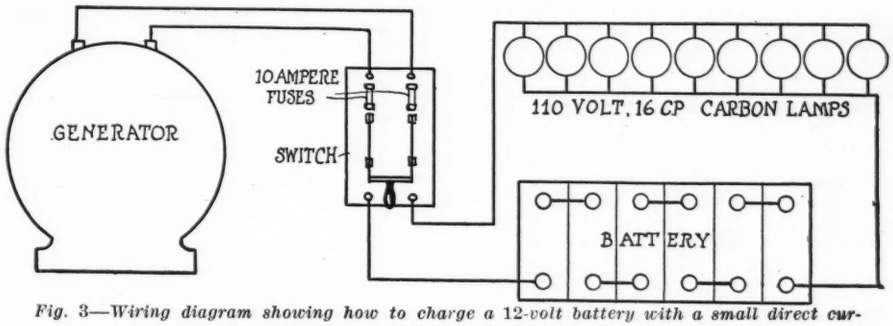


Fig. 3—Wiring diagram showing how to charge a 12-volt battery with a small direct current generator developing 4½ amp., 115 volts

TO assist readers in obtaining as a unit all information contained in this department on a certain subject in which they may be most interested, such as ignition, carburetion, etc., MOTOR AGE has inaugurated the segregation of inquiries into classes of allied nature. Questions pertaining to cooling will be answered under that head and so on.

THE ELECTRIC SYSTEM

R. R. Bascom.....Columbus, Ohio
S. W. Alter.....Forest, Ohio
Frank S. Pehanka..Washington, D. C.
Reader ..... Chicago

ENGINES

Robert King.....River Rouge, Mich.
C. G. Mentzer.....Harvey, Ill.
Albert Mohn.....Red Wing, Minn.
Hugh C. Russell.Keam's Canyon, Ariz.

CARBURETION

S. W. Alter.....Forest, Ohio

MISCELLANEOUS

Albert Baxendale.....Indianola, Iowa
G. A. Ashby.....Hawthorne, Nev.
G. N. Gunter.....Kansas City, Mo.

REBUILDING

M. Markmann.....Chicago
George H. Beatty.....Varna, Ont.
Jack Allen.....San Antonio, Tex.

No communication not signed by the writer's name and address will be answered in this department.

Miscellaneous

Differential and Gearshift Explained

Q.—Show diagram and explain operation of the Bailey differential and the C-H magnetic gear-shift.—Albert Baxendale, Indianola, Iowa.

The differential housing assembly of the Bailey gearless differential shown in Fig. 5 includes as a unit the center ring, the right hand flange and the right and left driving mediums to turn over the ratchets.

The right and left ratchets are keyed to the right and left axle shafts. These are independent from the driving media and are free to rotate within the differential housing. The pawls, which are the round members with knobbed ends, are placed crosswise of the assembly and are suspended on their lower sides by a projection from the center ring and above by a spring which fits into a spring cap in the housing. The pawls are the interlocking mediums between the differential housing and the ratchets.

The phantom view shows the right hand end of the top pawl in the tooth of the right hand ratchet and being driven by the contact force of the pawl-stop pin in the

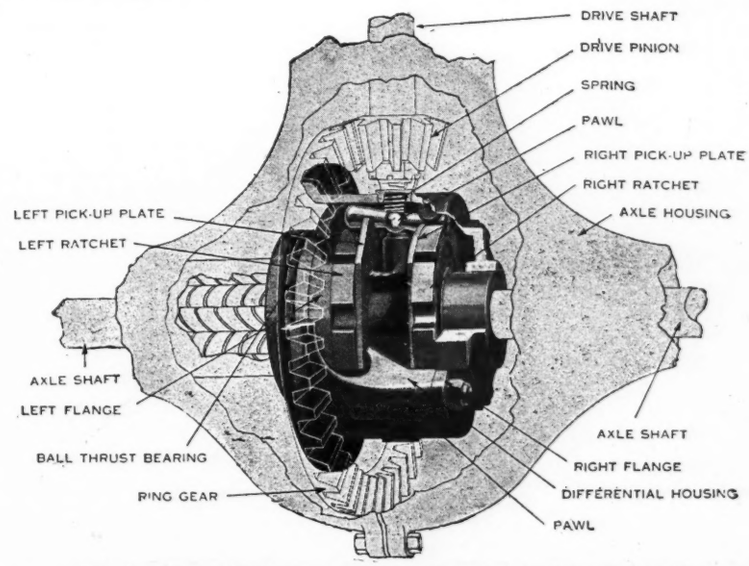


Fig. 5—Differential housing assembly of Bailey gearless differential

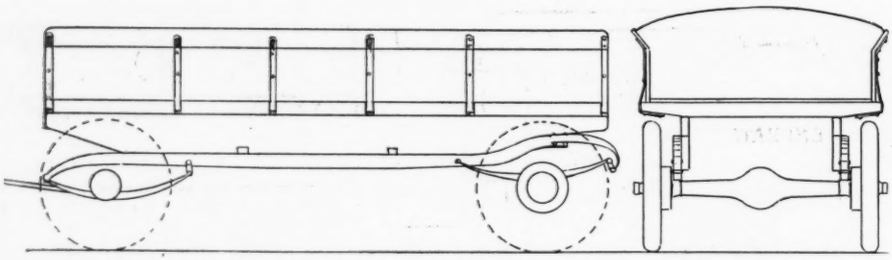


Fig. 6—Suggestion for making trailer with open flare body out of an old car

differential housing. This action drives the ratchet forward through the knob on the end of the pawl. In other words the ratchet is wedged to the differential housing by the pawl between the ratchet tooth and the pawl-stop pin. In the same manner the left ratchet is driven forward by the lower pawl which is engaged or wedged at its left end. Thus, both wheels are driven forward. The drive is positive because of the wedging effect and neither wheel can spin. When one or the other wheel overruns, the pawl engaged on that side frees the ratchet and permit it to turn free.

The C-H magnetic gearshift uses a set of coils or solenoids any one of which, when a current of electricity is passed through its windings, attracts an iron core normally resting in a hole running through the center of the coil. You can demonstrate the action for yourself by winding a quantity of magnet wire around a small tube of paper and connecting the ends of the wire to the terminals of one or two dry cells. A small finishing nail placed partly in the hole in the tube will be drawn in the rest of the way when the circuit is closed.

In Fig. 8 is shown the principle of operation of the C-H magnetic gearshift; details have been purposely left out to make the idea clear. The switch, which is fastened to the steering post usually has on it four buttons marked R—3—2—1 and N meaning reverse, high speed, second, first and neutral, respectively. The illustration also shows four coils of wire with iron cores passing through the centers of each pair. Thus the first and second speed have one core passing through both and likewise high and reverse. Let us suppose that the cores A and B have attached to them the shifter forks controlling the gears in the transmission. If the button 1 is pressed the circuit of No. 1 solenoid is closed and A will be drawn to the left.

To engage first speed, the button No. 1 is pushed in until it catches. Then the clutch pedal is depressed as far as it will go, where upon the first speed gears will instantly mesh. The clutch pedal is allowed to come back gently and the car moves ahead in first speed. To shift to second, button No. 2 is pressed until it catches and when desired to change the clutch is handled as before. In the same way the other shifts are carried out. To change down to a lower gear, the same procedure is followed. To get a neutral position, the N button is pressed and the clutch pedal depressed as before. Button N has no catch and does not stay down as the others do. If a button is pressed by mistake it can be rectified by merely pressing the correct one, which action automatically kills the first.

Thrust Bearing on Spindles

Q.—Would like information concerning remodelling steering spindles on a 2400 lb. car. I wish to remove the plain washer between the spindle and top half of axle, and substitute two hardened washers with a thrust bearing between using ¼ inch balls. Will these be strong enough to carry the weight and will it steer easier?—G. A. Ashby, Hawthorne, Nev.

There is no question but what the installation of a thrust bearing as shown in Fig. 7 will make the car steer somewhat easier, but it is a question of how long the bearing will stand up. For one thing the balls are hardly large enough and there would be quite a load on them. Also being unprotected from water, dirt, grit, etc., it appears to us that they would be short-lived. However, if the bearings were of large diameter, the steel balls of ample size and proper provisions made for lubricating them, the idea might work out satisfactorily on a car weighing 2400 lb.

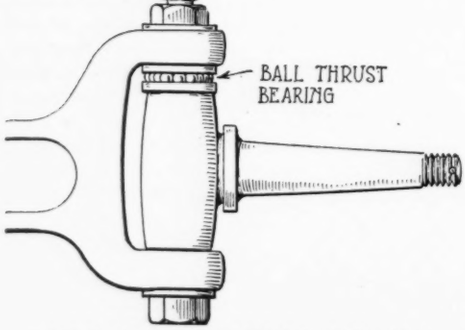


Fig. 7—Installation of ball thrust bearing

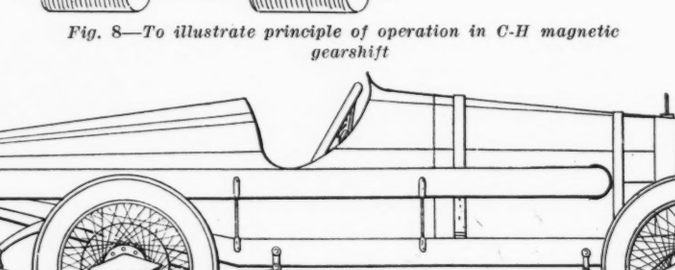


Fig. 8—To illustrate principle of operation in C-H magnetic gearshift

Rebuilding

Reader Suggests Speedster

Chicago—Editor MOTOR AGE:—This body has been designed to give an idea of how a speed body would appear fitted to an ordinary chassis having a wheelbase of 105 inches. The lines from the radiator to the tip of the tail are almost unbroken. This makes for less wind resistance—that highly important factor in race work. From the radiator back, the hood and cowl have a slight upward slope. At the top of the cowl a small plate which has a more decided curve is placed to deflect the wind. The driver's seat is set slightly ahead of the mechanic's so that the driver's arms are free to move without coming in contact with anything. The tail is brought to a point—another feature which tends to eliminate the great amount of suction which takes place in the rear of the speed car. From the seat backs to the point of the tail there is a slight downward slope which, however, is not very great. This makes less suction about the driver's and mechanic's heads, and consequently relieves them of a great strain—something to be considered in a long race.

The end of the exhaust pipe is curved down slightly. The slope of this curve tends to form a small suction, which naturally helps the exhaust gases to get away quicker than if the pipe were simply straight. Then, too, this curve naturally directs the gas and flames down and away from the tail, where it might prove dan-

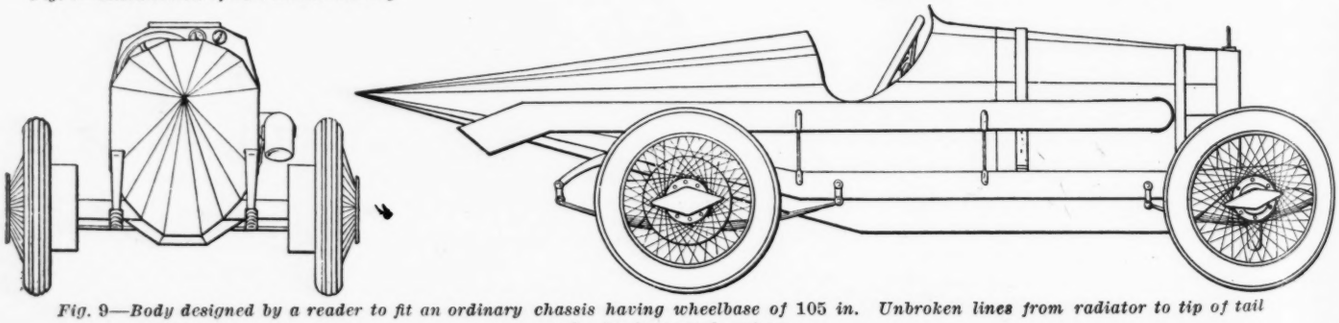


Fig. 9—Body designed by a reader to fit an ordinary chassis having wheelbase of 105 in. Unbroken lines from radiator to tip of tail make for less wind resistance

gerous were a gasoline tank placed there. The drip pan is also in keeping with the body and joins to the tail so as to keep the lines unbroken.

The wheels are fitted with 32 by 4½ in. tires. This lessens the clearance, but it also brings the weight of the car closer to the ground and makes the car hug the track better, which naturally assists the driver in negotiating turns at a higher rate of speed. The small wheel and tire also lessens the amount of unsprung weight.

This body was designed with economy as one of the chief factors in mind. It will be noticed that throughout the entire body there are no curves which would require a die or mould to shape, as the entire form has been produced by the use of straight lines. This body can be made by any good tinner or even the layman, although the latter is not advised to attempt this.—M. Markmann.

Rebuilding Englewood-Staver

Q.—Show sketch of an Englewood-Staver, five-passenger, four-cylinder car rebuilt into a speedster. Would like it as low as possible without changing the frame. What would be the cost?—M. S. Engel, Lowpoint, Ill.

A suggestion for rebuilding the car into a speedster is shown in Fig. 11. It is hard to give an estimate of the cost to turn out a job like this, but experience indicates that it would be in the neighborhood of $150 to $200, depending on whether the owner does the work himself. Building a speedster generally necessitates changes in cross shafts, steering gears, etc., which means more or less machine work if a good job is to be had and these things run up the cost.

Making Trailer Out of Old Car

Q.—Please show diagram of how to make trailer out of an old car.—George H. Beatty, Varna, Ont., Canada.

A suggestion for making a trailer with open flare body out of an old car is shown in Fig. 6. In preparing the car so it can be used as a trailer, several things should be done. For example, after the engine, radiator, etc., have been removed, the drive shaft is taken out of the tube leaving the differential and rear axle parts in place. If the third member or drive shaft tube is fitted with a yoke at the forward end, leave the entire assembly in place, after the shaft has been taken out. The construction of the car will determine to some extent just what parts can be left in place, but so far as possible, everything should be removed which is not necessary in the trailer. You will not need the steering gear, so take it out also and fit a one-man tow bar to the front axle as was described in MOTOR AGE recently. This will take care of the front wheels on a corner. The body rests on wood sills made of 2 in. planks set up on end on the frame. The main part of the body constructed about as shown. If desired a platform can be built on the sills and a staked body used.

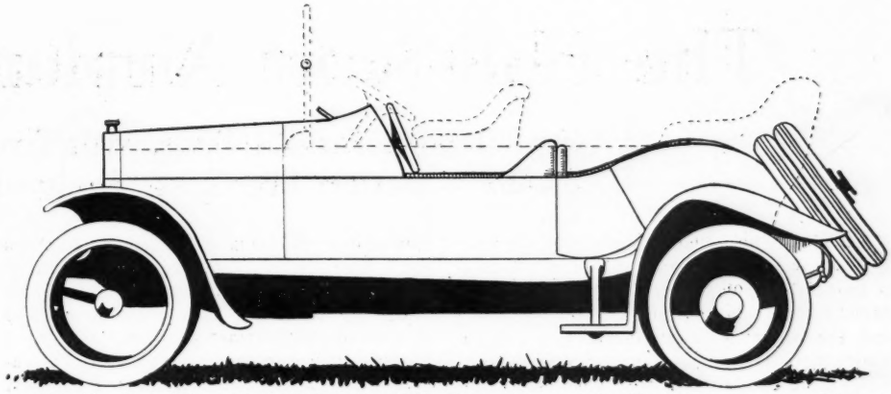


Fig. 10—Suggestion for transforming 1911 Pierce-Arrow into three-passenger speedster

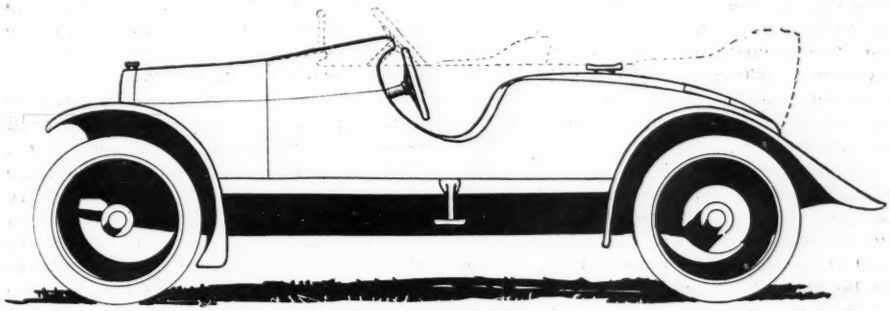


Fig. 11—Suggestion for changing Englewood-Staver car into a speedster

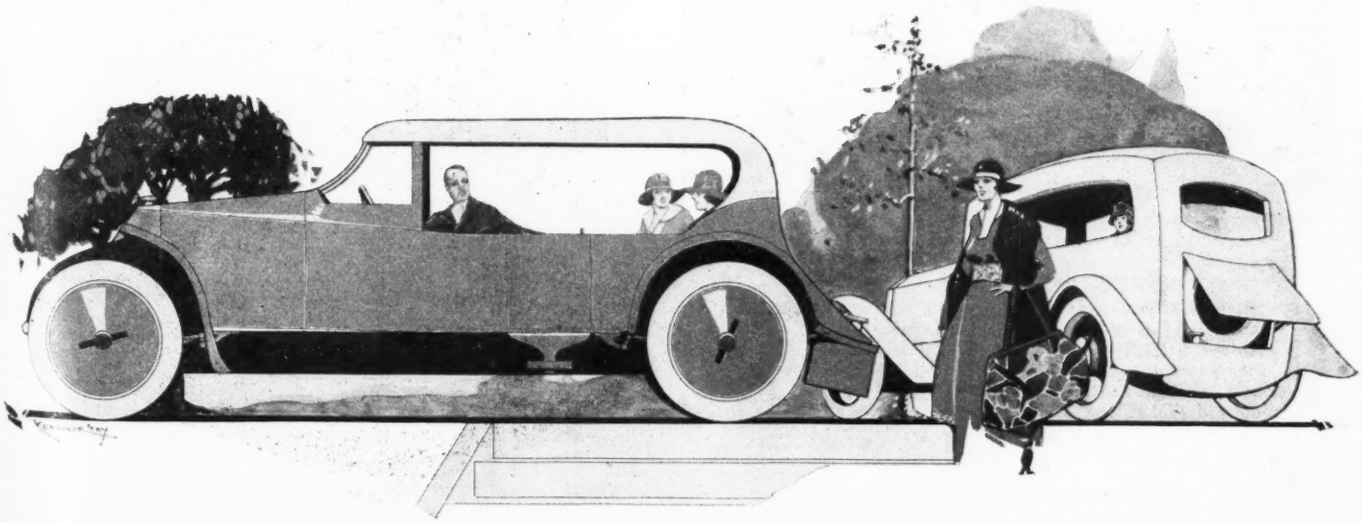
For the Ultra Motorist

HERE is another distinctive body type. While not so novel in its manner of entrance and egress as that of a recent issue in which passengers and driver enter from a door in the rear, the individualistic lines of the top and manner of concealing the tire in the rear of the body are altogether unusual. The fenders units with the coach-like lines of the body proper by a flare that is different from that of most fenders. You will notice that throughout the car the lines seem to sweep one into another, giving that luxury and beauty of appearance sought by the ultra-motorist. This body also is designed by a MOTOR AGE artist, Kenworthy.

1911 Pierce-Arrow Into Speedster

Q.—Publish diagram showing how to transfor a 1911 Pierce-Arrow 48-hp. into a three or four-passenger speedster. I should like to raise hood and radiator about 10 in.—Jack Allen, San Antonio, Tex.

An idea for transforming this car into a three-passenger speedster is shown in Fig. 10. The dotted lines indicate the position of the old body and from this you will note that the radiator and hood have been made higher. As a novelty the rear fender and step are incorporated in a unit. The door opens into the rear compartment and entrance gained to the front seats by a passageway between them.



The Hall-Scott Airplane Engine

Of Overhead Camshaft Type, with Two Valves per Cylinder — Latter Are Cast Singly of Semi-Steel

ONE of the most interesting pre-war types of American aircraft engines is the Hall-Scott, which is now being produced in two plants, one in Berkeley, Cal., and the other in Indianapolis, Ind. It is made in two types, a four-cylinder and a six-cylinder which, however, are very similar in construction. The following description applies particularly to the four-cylinder type which has been approved by the War Department for use on primary training machines. Details of this engine were obtained for this article at the Marmon plant in Indianapolis during the latter part of July.

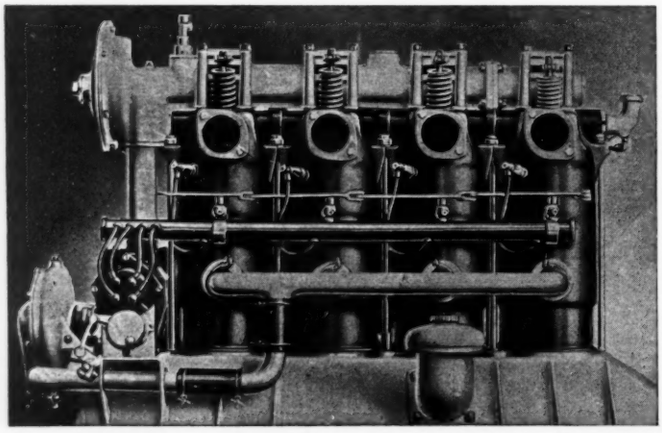
Having a bore of 5¼ in. and a stroke of 7 in., the piston displacement is 606 cu. in. and at 1400 r.p.m. the piston speed figures out to 1633 ft. per min. Also, as the engine is required to develop 103 hp. on the brake at 1350 r.p.m., it must develop a brake mean effective pressure of 113 lb. per square inch. Each cylinder is a separate casting of semi-steel, with the water jacket and head integral. An interesting feature of construction is the method of holding the cylinder castings down to the crankcase. For this purpose ten ½-in. rods are used, which not only hold the cylinders in place on the crankcase, but extend through holes in the webs in the top half of the crankcase and also serve to hold the caps of the crankshaft main bearings in place. Each cylinder casting is provided with lugs at the four corners, and these lugs are drilled and partly milled away, in such a manner that when the remaining portions of the lugs of adjacent cylinders abut, they form a hole for the retaining rod to pass through, which thus clamps down the cylinder. To make this method of cylinder attachment practicable it is, of course, necessary that all cylinders be machined to exactly the same lengths between their bottom flange and the top of the holding down lugs. The two outer lugs on the end cylinders remain complete and the holding-down rods pass through these lugs.

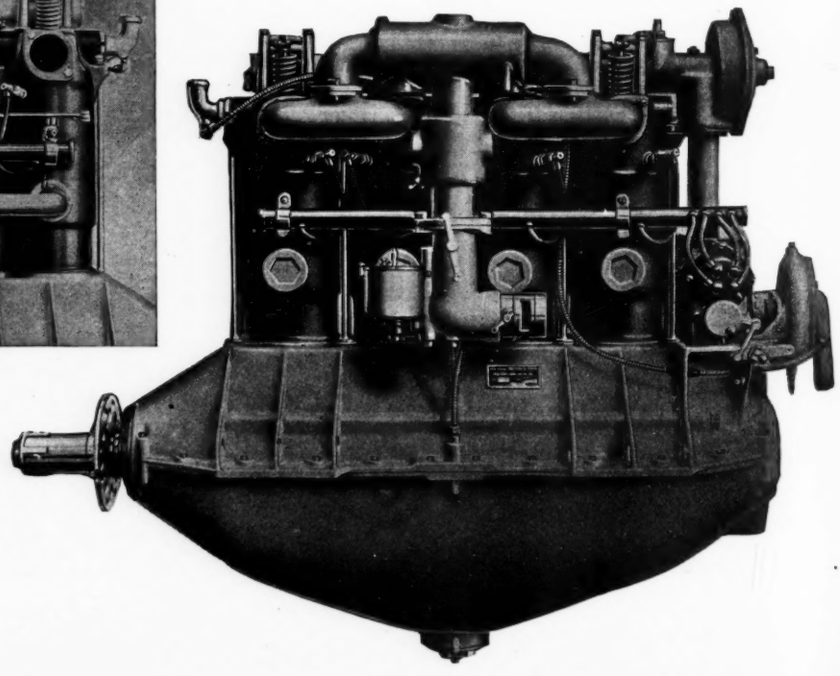
Valves Seat in Cylinder Head

The valves are located in the cylinder heads and are operated from an over-head camshaft through short tappet levers. There are two valves in each cylinder, one inlet and one exhaust valve. They have a clear diameter of 2½ in. and are inclined 16 deg. against the cylinder axis. Both valves are seated directly in the cylinder head, which means, of course, that in order to regrind a valve or replace it the cylinder has to come off the crankcase. The reason for seating both valves directly on the metal of the cylinder casting is that in this way it is possible thoroughly to cool the valve seats. The valve passages are elbow-shaped and open to the sides of the engine.

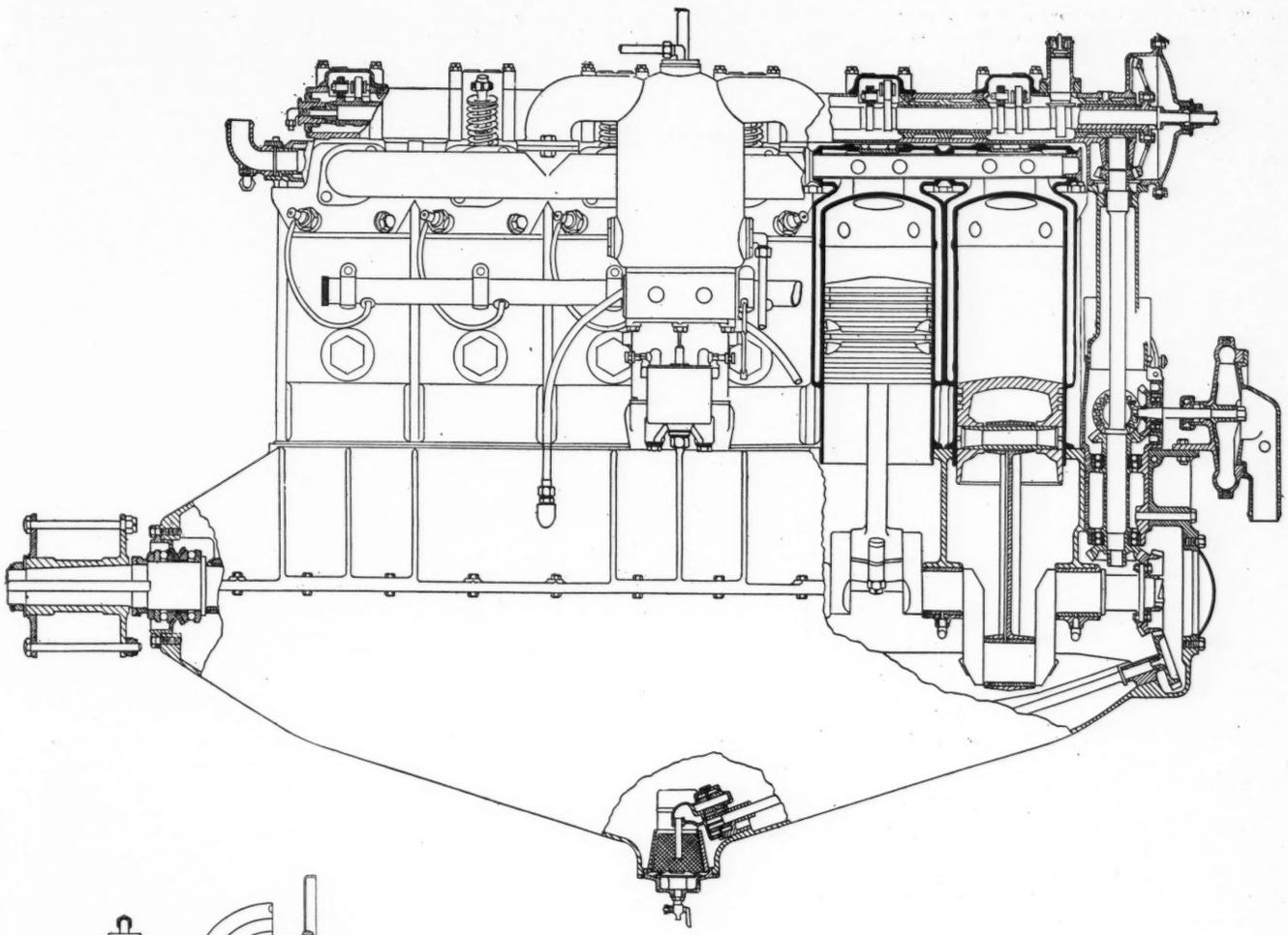
On both sides of the cylinder castings there are openings for water connections. These bosses are faced off even with the lugs by means of which the cylinders are held down to the crankcase, which facilitates the machining of the cylinders. The water joint bosses are bored out and three lengths of steel tube are inserted, each connecting a pair of adjacent cylinder jackets. A short piece of rubber hose is placed over the water connection bosses and is clamped tight by means of a hose clamp. Water from the circulating pump enters the jackets at the bottom, through a separate connection to each jacket, and it leaves the jackets through an elbow fitting at the rear of the engine.

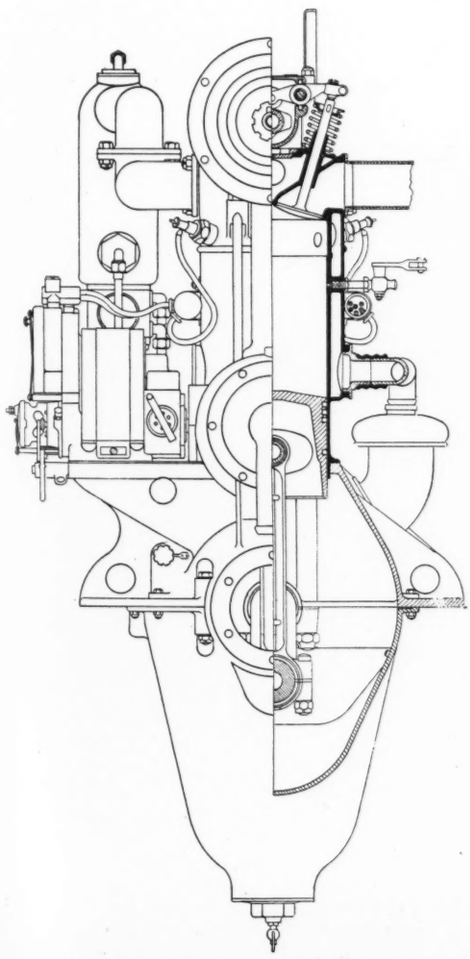
Die cast aluminum pistons are employed. These are of quite unusual design in that the piston head and a considerable portion of the skirt are about ½ in. thick, the object in using such heavy walls being, of course, to facilitate the flow of heat from the head to the skirt. The piston is cut with grooves for three compression rings near its top end and with a groove for another ring directly over the center of the piston pin. Depressions are formed on the piston surface where the bosses are located, so that any slight distortion of the bosses will not affect the bearing of the piston in the cylinder. Each piston casting in the rough state weighs 6½ lb. and after being fully machined 4 lb. There are no ribs inside the piston to strengthen the bosses and help conduct away the heat, these being rendered unnecessary by the heavy wall thickness employed. The bosses are very firmly secured to the skirt, however, by large fillets; in fact, the bosses really form solid segments inside the cylindrical skirts. A single pin screw holds the piston pin in place, an additional safety device against drifting being provided by the lower piston ring. All of that part of the skirt not





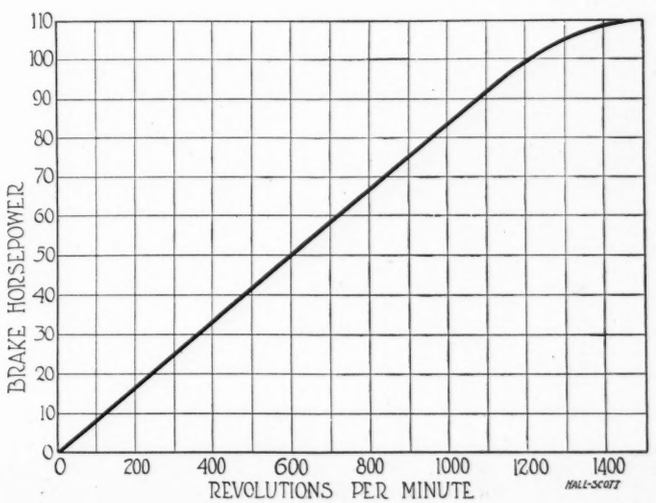
Above—Exhaust side of Hall-Scott engine, showing method of holding down cylinders. Right—Inlet valve side of engine, showing carbureter and manifold. Note also the flexible tubes to the inlet manifold jacket and oil distribution pipe





Internal Construction and Performance of Hall-Scott Airplane Engines

Above—Longitudinal elevation, partly in section, of the six-cylinder engine. On the left—Front elevation, partly in section, of the same engine. Below—Horsepower curve of the four-cylinder engine. Note the camshaft and accessories drive and the heavy section of the piston walls



occupied by ring grooves has oil grooves cut upon it. The skirt wall is tapered from about the axis of the piston pin to the open end, while the head is plain. Over the whole length of the skirt the piston is finished up to 0.020 in. below the nominal cylinder bore and on the lands, it is finished to diameters which are 0.025, 0.030 and 0.035 below the cylinder bore respectively.

Connecting rods are made from drop forgings of I-section and are finished all over. A bronze bushing is forced into the wrist pin end and is broached out to a diameter of 1⅛ in. As an indication of the accuracy of the workmanship required on engines of this type it may be stated that the limits on the wrist pin hole are —0 and +0.00025 in. An oil tube extends from the bottom bearing of the connecting rod up alongside of the web of the shank to the top bearing. The connecting rod cap is held in place by two bolts with castellated nuts and split pins. Shims are inserted between the connecting rod head and cap for purposes of adjustment. The bearing bushing consists of two-half shells of bronze which are babbitt lined. The bore of the big end of the connecting rod is 2 in. The length of the crankpin bearing is 2⅞ in. All of the connecting rods are balanced by weighing, the weight of the finished rod being 3 lb. 12 oz. and the limits + ¼ oz.

Five-Bearing Crankshaft

A five bearing crankshaft is used, having main journals 2⅛ in. in diameter. All intermediate bearings are 2 in. long. The forward end bearing is 2¼ in. long and the rear end bearing 5 in. Three-quarter in. holes are drilled through all of the journals of the crankshaft with the object of lightening it, and also in the case of the crankpins, to help in the lubrication. To a forged flange at the forward end of the crankshaft is bolted the camshaft pinion. The crankshaft is a chrome nickel steel forging and is machined all-over. It is provided with a thrust collar to the rear of the rear bearing, back of which is mounted a double ball thrust bearing. The propeller hub seat is turned to a taper and cut with a keyway. Being made of alloy steel the crankshaft is, of course, heat treated.

Before machining the crankshaft is annealed to 45-50 scleroscope hardness. After the crankshaft has been finished it is subject to inspection, which must show that all crankpins are parallel with the main bearings to within 0.001 in. and are not over 0.0005 in. out of round. With the shaft mounted in front and rear bearings the center bearing must not run out to exceed 0.01 in.

The crankcase is made of two aluminum castings bolted together in a plane through the axis of the crankshaft. The crankcase is scraped both inside and outside—inside before machining and outside after machining—the object being to get rid of all sand and foreign matter, so it cannot get into the oil. In the new Marmon factory it is planned to boil all castings in super-heated water at 500 deg. F. to relieve all strains before machining. No gasket is used between the cylinder bottom flange and the top of the crankcase, these surfaces being hand scraped. The joint between the halves of the crankcase is also hand scraped, yet a paper gasket is used in this place. Four supporting lugs are cast integral with the top half of the case, these being substantially ribbed, though the ribs are of very thin section. There is a combined breather and oil filler at the left hand side. An oil pipe is cast in the crankcase on the right hand side, through which oil is distributed to the different main bearings. The top half of the crankcase is cast with a web for each intermediate bearing, and this web is formed with vertical, cylindrical enlargements through which the holes for the cylinder holding down rods are drilled. Lubricating oil is positively delivered to each of the main bearings. It will be noticed that the crankcase lower half slopes toward the center, at which point there is located a gauze filter, secured to a removable plug, in the center of which there is a drain cock. Adjacent to this filter and supported on the bottom of the crankcase, is an oil pump of the gear type, the inlet pipe of which extends into the filter. The pump is mounted at an angle and its drive shaft extends forward inside the crankcase practically parallel with the bottom of the case. At the forward end it has secured to it a bevel pinion which meshes with the bevel pinion on the forward end of the crankshaft. This latter bevel pinion is a double faced pinion, one set of its teeth serving to drive the pump shaft and the other set to drive a vertical shaft connecting to the camshaft running across the tops of the cylinders.

The vertical shaft, which is mounted in two combined radial and thrust ball bearings at and near its lower end, and in a plain bearing at its top end, runs at crankshaft speed. Directly above the intermediate ball bearing this shaft carries a bevel pinion which meshes with three other bevel pinions of the same size as itself. The pinion forward of the vertical shaft drives the circulation pump, and the other two pinions, which are mounted on a common axis, drive the two Dixie high-tension magnetos, located on opposite sides of the vertical shaft. The vertical shaft is inclosed in an aluminum housing, which is formed with large openings toward the front and both sides at the point where the drive for the magnetos and the water pump is taken off. The bevel gears for the magnetos and pump are mounted directly on the shafts of these devices and no extra bearings are required in the housing. Aluminum caps are fitted over the magneto and pump shafts, back of the driving gears These caps enter the openings in the housing for the vertical shaft and are clamped in tight.

Located on top and extending lengthwise of the engine is the hollow camshaft which has an outside diameter of 1⅛ in. and an inside diameter of $\frac{11}{16}$ in. At the forward end this camshaft is formed with an integral flange to which its driving gear is bolted. The cams are forged integral with the camshaft, cut and ground accurately to size and hardened. They act on the valves through the intermediary of short rock levers which have arms of equal length and are provided at their outer end with gasket is used between the cylinder bot- set screws for adjustment purposes. The valves have a lift of ⅜ in. and the set screws are adjusted to give a clearance of 0.02 in. The camshaft is located in a camshaft tunnel, consisting of an aluminum casting in one piece which is bored out and has aluminum bearing bushings inserted which are of larger outside radius than the maximum radius of the cams. These bushings are made in halves and held together by means of two machine screws, with brass shims between. There are babbit liners with oil grooves in these bushings and the shims hold the babbit in place.

At the top of the vertical shaft is located the bevel gear set giving the 2 to 1 reduction for the overhead camshaft. The large bevel gear is inclosed in a housing formed integral with the camshaft tunnel. This is cast open at the forward end and provided with a cover plate, a paper gasket being inserted at the joint. From the forward end of the camshaft a speedometer drive is taken off.

The centrifugal water pump at the forward end has an aluminum housing and a bronze propeller. It is provided with a supporting bracket which is bolted to the crankcase top half. As it leaves the pump the water passes through a pipe leading under the magneto base on the left side and which then bends upward and through a hose joint connects with the aluminum water manifold, each branch of which connects to one of the cylinder jackets by a short length of hose.

Water Pump Mounting

On former models of Hall-Scott engine the lubricating oil was passed through an inlet manifold jacket, which resulted in the oil being cooled and the inflowing charge heated. This practice is no longer followed, however. The oil pump already referred to draws its supply from the sump and delivers it to the horizontal oil distributing pipe cast in the upper half of the crankcase, whence copper tubes with flared tube joints connect to each of the main bearings.

A 2-in. Zenith aluminum carbureter is used and connects to the inlet ports of the cylinders through an aluminum inlet manifold made in three parts. This manifold is water jacketed so as to insure thorough vaporization of the fuel. Short length of steel tube with a flange brazed on are used for exhaust pipes on each cylinder.

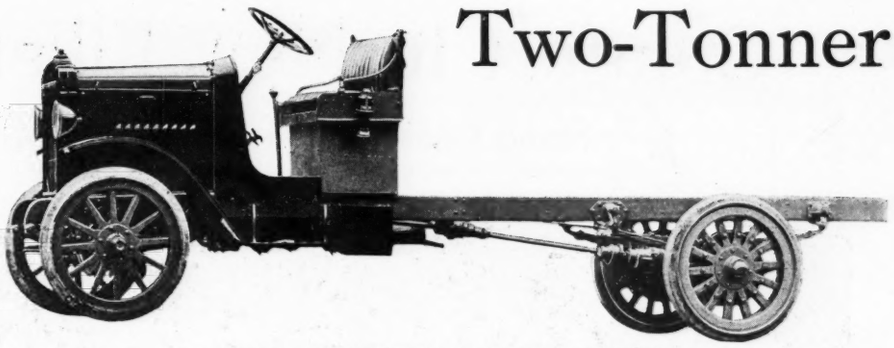
The high tension cables from the two magnetos are led along opposite sides of the engine in net tubes of insulating material and connect to the spark plugs which are screwed into bosses formed in the cylinder castings. The wiring is thus exceedingly simple. The two plugs being located on opposite sides of the combustion chamber the very best effect from the two point ignition should be obtained. Pet cocks are screwed into other bosses formed in the cylinder castings and are all connected together by a link so that the operator can open and close them from the seat.

RECEIVER FOR DETROITER

Detroit, Oct. 5—The Detroiter Motor Car Co. has been placed in the hands of a receiver, and the Security Trust Co. of Detroit has been named as trustee. The Security Trust Co. will endeavor to determine the assets and liabilities of the company and will then notify creditors.

Nash Adds Two-Tonner

Truck Line Now Includes Two Internal Gear Jobs and the Quad



Two-ton truck chassis, a newcomer for Nash

THE Nash Motors Co., Kenosha, Wis., has dropped its 1½-ton model and its line is now made up of the 1-ton job described in MOTOR AGE July 5, and a new 2-tonner which is a complement to its present line designed to fill the gap between the 1-ton and the Quad. It is designed along the conventional standard lines and is built with special consideration for sturdiness and dependability. The engine, which is the same as that used in the 1-ton except larger, is a four-cylinder, L-head, with a bore of 3¾ in. and a stroke of 5¼. With a piston displacement of 231.9 cu. in., the horsepower to displacement ratio is 1 to 10.3. A Simplex, four-ball, centrifugal type of governor limits the engine speed to 1290 r. p. m. and the road speed to 16 m.p.h.

The cylinders are cast in block, and each piston has four rings. Valves are on the right side and the smallest valve opening is 1¾ in. Die-cast babbitt is used in the crankshaft and connecting rod bearings, all of which are of the plain type.

A centrifugal pump is used for cooling and in the radiator, which is of the cast tank type with removable core, provision is made to prevent slopping and waste of the cooling water. The fan is a four-blade mounted on a spring tension bracket, driven by a 1-in. flat leather belt. Lubrication is combination force feed and splash, a plunger pump being operated from an eccentric on the camshaft.

Fuel is taken through a Stromberg, Model ME, carbureter with hot air intake from a 16-gal. tank located under the seat. Ignition is Delco.

The clutch is a dry-disk, one plate of steel in contact with two plates of friction material. There are two adjusting nuts for taking up wear, these being located on the outside of the clutch. The gearset, which is in a unit with the engine and of the selective type, gives a gear reduction from engine to wheels in first speed of 25.92 to 1; second, 15.187 to 1; third, 8.1 to 1; reverse, 31.42 to 1.

M. & S. spiral gear, automatic locking differential is used and drive is internal gear. The dead axle is tubular and somewhat different from that used in the 1-ton job. There are no torque or radius rods, drive and torque being taken up through the springs.

The frame is pressed channel steel, with a depth of 6 in. and a flange width of 3 in. The length of the frame, over all is: Standard, 203½ in.; special, 227½ in. The width is 33½ in. in the rear and 28 in. in front. The frame is 30 in. from the ground when under full load. Tread is 56½ in. in front and 59½ in the rear. The standard wheelbase is 144 in., giving 120 in. back of the driver's seat, while the long wheelbase is 168 in. with 144 in. back of the driver's seat.

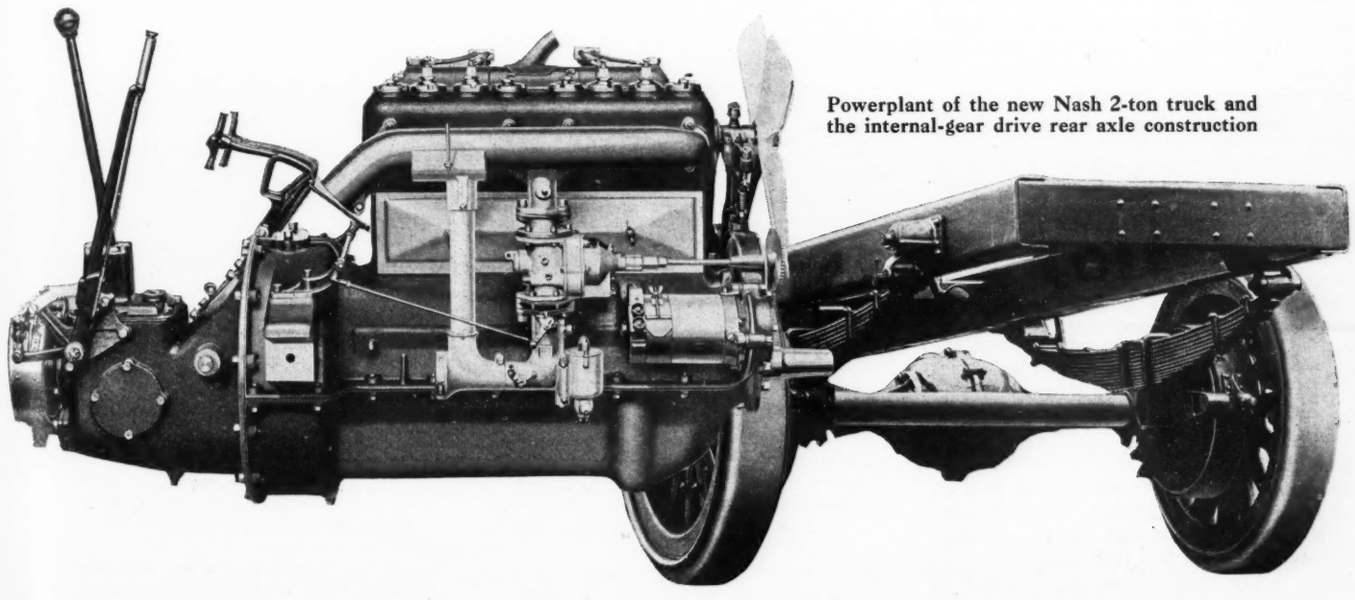
Service brakes are external contracting on the rear wheels, and the emergency is of the same type but located on the drive shaft. This is the same type of construction as is found on the Nash passenger cars. Thirty-four by four solid tires are fitted in front and 34 by 6, solid, pressed-on type in the rear.

Simple and accessible take-ups and adjustments are provided for the clutch, steering connections, brakes, driving pinions, fan belt, etc. Ground clearance is 9¼ in. and all trucks are equipped with electric starting and lighting with the usual complement of tools, etc. Prices of the Nash line are: 1-ton, $1,495; 2-ton, standard chassis, $1,875; and the Quad, $3,250. The new model comes in lead finish without body at the price quoted, but if body is ordered, the body price includes painting of both the body and chassis.

20,000 CHALMERS THIS YEAR

Detroit, Oct. 6—Walter E. Flanders, president and general manager of both Maxwell and Chalmers now, will not promise Chalmers dealers more than 20,000 cars this year, but has assured them each one will be of highest quality. The entire executive staff of Maxwell moved its headquarters to the Chalmers plant the other day, where all sales will be directed, except for a sales department at the Maxwell factory.

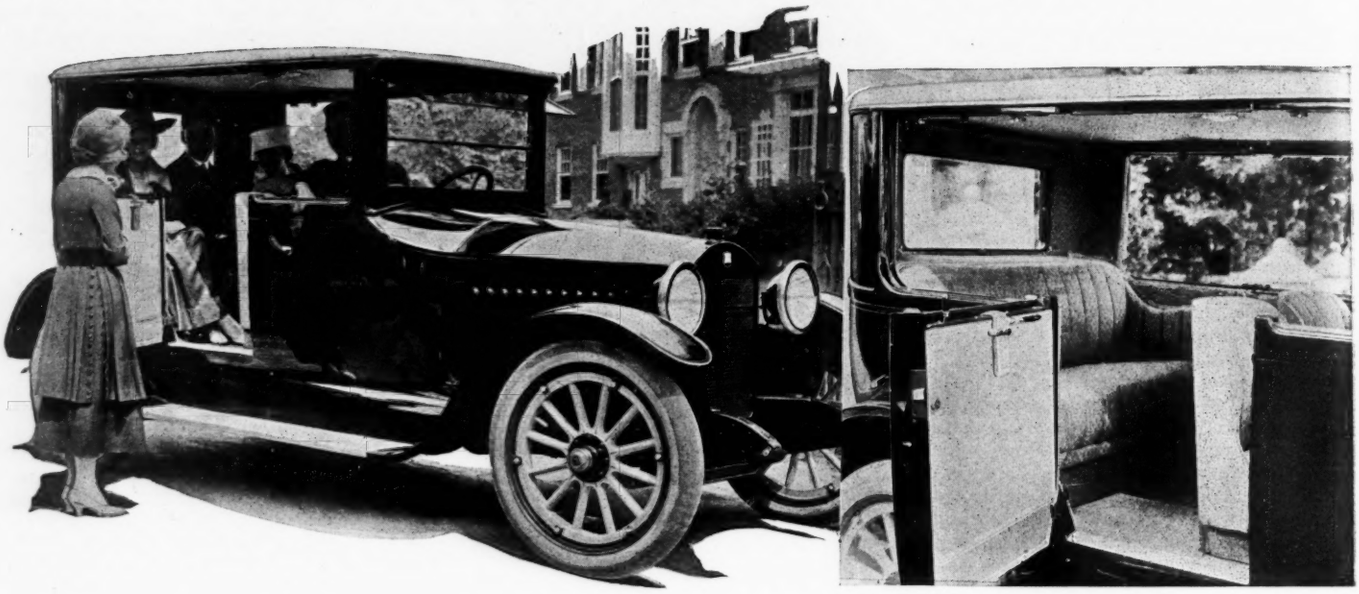
The general staff is practically the old Maxwell staff. Thomas J. Toner is sales manager and in charge of advertising for both companies. Walter M. Anthony is comptroller. Charles Adams is production manager; William Kelly and E. J. Miles, engineers; Roy M. Hood is purchasing agent, and Carl H. Pelton is assistant to Mr. Flanders. Mr. Pelton, who is an attorney, also will look after the legal business of both companies. B. A. Lyman is assistant treasurer; H. H. Johnston, general auditor; and Gordon Muir, advertising manager.



Powerplant of the new Nash 2-ton truck and the internal-gear drive rear axle construction

Comfort in New Liberty Sedan

Same Chassis with a Few Minor Changes



The top of the new Liberty sedan is hung somewhat lower than in usual practice and adds to its appearance. Entrance and egress are made easy by two individual doors for drivers and passengers. Note the width of the door that admits to the rear seat

THE new sedan brought out by the Liberty Motor Car Co., Detroit, is distinctively Liberty throughout with the same straight lines and trim appearance that have marked this company's products from the start. The body is mounted on the same chassis of 115-in. wheelbase as the other bodies, the chassis being continued with only a few minor changes, chief of which is the use of an aluminum chankcase on the engine.

Top Is Lower

The new sedan gets much of its smartness from the top, which is hung somewhat lower than in average practice. The general design, however, is for comfort as well as appearance, and the location of the doors is such that entrance for the driver is easy and does not disturb any other passenger. The door on the left opens into the driver's compartment, and the door at the right opens into the rear compartment. As the front seats are separated, all seats are easily accessible from either door, if so desired.

The car is upholstered in pleated gray whipcord, is fitted with silk curtains and comes in cobalt blue. The wheels are offered in either of two colors, straw or cobalt, to match the body. The driver's seat is adjustable, and the switch controlling the interior lights is placed at the side of the rear compartment so that it is convenient to all occupants. The door to the front compartment can be locked from the inside, thus making unnecessary more than one key to lock the entire car from the outside. As with other sedan models, the front windows drop into the body panels and the rear windows have their compartments behind the rear seat.

Five other body styles are included in the Liberty line, a roadster and five-passenger at $1,359; brougham and landaulet at $2,700; and the detachable-top touring car at $1,625. The new sedan sells at $1,925.

The color of all models except the brougham and landaulet is cobalt blue with blue or straw-colored wheels. The upholstery has been changed to the straight-pleated type. The lamps are larger. The front seat of the roadster is now adjustable. Other improvements include a lower front license bracket, metal binding instead of cloth on the top bows and haircloth carpets.

W.-O. SALES FOR SEPTEMBER

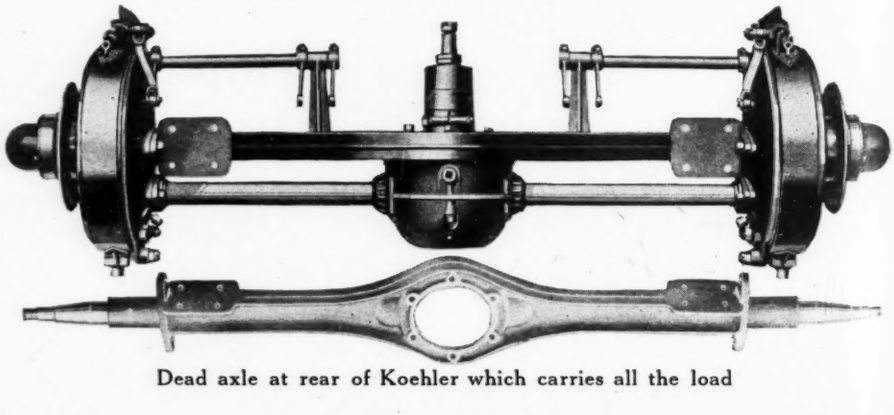
Toledo, Ohio, Oct. 5—Willys-Overland, Inc., shipped 8986 cars during September. In the same period it received orders at the factory for 6458 cars, while dealers sold 7928 cars at retail.

During the ten weeks of John North Willys' sales congress contest which closed Aug. 22, 47,212 Willys-Knight and Overland cars sold at a retail value of $39,237,250, making a new record for Willys-Overland sales. For ten weeks the Willys-Overland products were sold at an average of 4721 cars each week and 783 cars per day.

TO MAKE GEARLESS ENGINE

Green Bay, Wis., Oct. 6—The Crank Shaft Valve Movement Corp., Green Bay, Wis., will manufacture and market a new type of internal combustion engine designed by Jules Gerard, and upon which he has been working for seven years or more. The feature of the new type is that it is gearless and all reciprocating parts are operated from the crankshaft, this including the valves, magneto, generator, pump and other parts.

The Gerard motor is designed for application to passenger and commercial cars, airplanes, tractors and boats, being a light, high-speed type of great flexibility. It is stated that the model upon which patents have been applied for developed from 35



Dead axle at rear of Koehler which carries all the load

to 40 per cent more horsepower than a similar poppet-valve type of the same weight and cylinder dimensions. An engine weighing about 350 lb. developed from 60 to 70 hp. at a fuel consumption figured on the basis of between 25 and 30 m.p.g. of gasoline.

1918 Koehler Chassis with Body Equipment

THE engine for the 1918 Koehler 1¼-ton chassis, made by the H. J. Koehler Motors Corp., Newark, N. J., is a four-cylinder valve-in-head type with cylinders cast in block and waterjackets integral. The cylinders have a 3½-in. bore and a 5-in. stroke, with a rating of 19.60 by S. A. E. formula and developing 35 hp. at maximum capacity. Lubrication is by combination pressure and splash system, and ignition is by Eisemann high-tension magneto.

Power is transmitted through a tubular shaft with universal joints at either end to a Torbenson internal gear-driven rear axle. The axle consists of an I-section dead axle with expanded center on which is mounted the jackshaft, the differential housing being bolted to the center of the axle and the outer ends carried by the flanges that support the brake shafts and, fitting within the brake drums, inclose the internal brakes and the gears and pinions by which the wheels are driven. All the load is carried on the dead axle. The wheel spindles are vanadium steel fitted with Bower roller bearings. The gears and shafts are nickel steel, and the shafts and differential are mounted on Bock adjustable roller bearings.

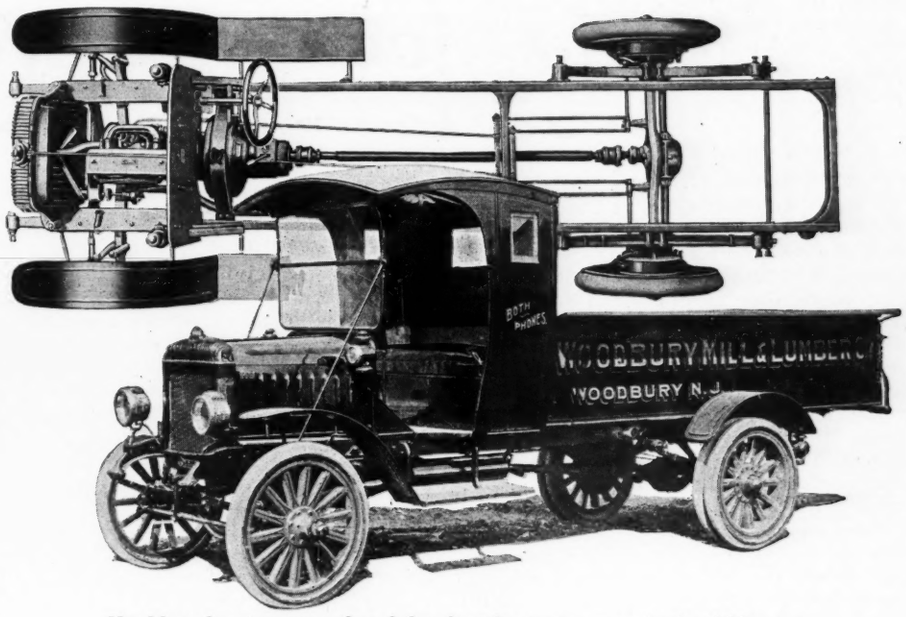
Semi-Elliptic Springs

The front axle is heavy I-beam section type. The steel frame is channel section, while springs are semi-elliptic, 38-in. forward and 46 in. at the rear. The wheels are wood, artillery type, and take tires 34 by 3 in. front and 34 by 5 in. rear. The wheelbase is 129 in. and the tread standard 56 in. Control is conventional, and external contracting service and internal expanding emergency brakes are direct on the rear wheels.

Equipment includes front fenders, driver's seat with lazy back, oil dash and tail lamps, mechanical horn, tool kit, etc. The chassis will take a body approximately 48 in. wide between the rear wheel and 108 in. or more long. When desired the chassis will be equipped with express type body, including built-in driver's seat and rear fenders, for $50 extra, and this body can be fitted with a four-post canopy top for $50 additional. A stake body 5 by 9 ft. is $65, and driver's cab top complete with curtains is $50. The bodies are painted black and the wheels Bordentown orange. Price of the chassis complete is $1,150.

WHAT'S IN A NAME?

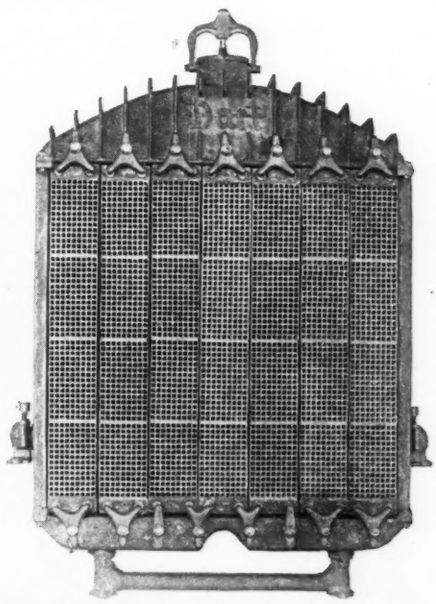
Toledo, Ohio—Willys-Overland, Inc., has a salesman down in Paris, Tex., who is named B. D. Chandler. His last name might cause more comment if it were not that Fords, Mitchells, Abbotts, Allens, Andersons, Hayneses, Franklins and many others with the names of motor cars also sell Overlands. The surprise in the name of the Texas salesman lies in his full name, which is Briscoe Dodge Chandler. In other words, Briscoe Dodge Chandler sells Willys-Knights and Overlands.



Koehler chassis stripped and fitted with express type body, $50 extra

DISTINCTIVE DART RADIATOR

The Dart Motor Truck Co., Waterloo, Iowa, is equipping its latest 3½-ton trucks with a distinctive radiator that varies from the usual construction in that the core is composed of seven separate sections, each independent and held in the casing by separate clamps. The construction follows the usual in having cast tanks at top and bottom, the top tank being finned to increase radiation. The cores are of the honeycomb type, 4 in. deep, giving large cooling surface. In case of damage by accident any section can be removed by loosening two bolts. Such removal does not disturb the other sections in any way, as each section has separate openings into the top and bottom tanks and is equipped with individual gaskets.



New Dart radiator, which is built of seven separate sections

Repairs for any section are made without laying up truck and replacements are economical because only the sections damaged need be purchased. Both sides of the radiator are connected with the circulation system, giving an even flow of water. Plugs for the openings and extra gaskets come with the truck and are carried with the tools. The total capacity is 15 gal. The radiator is mounted on ball and socket trunnions, facilitating easy removal and taking up weaving action of the truck. A patent has been applied for.

SUPREME MOTORS MOVES

Indianapolis, Ind., Oct. 6—The Supreme Motors Co., Cleveland, Ohio, will move its headquarters to Fort Wayne, Ind., where a manufacturing plant for temporary use is to be leased within a few days. The company has a capitalization of $1,000,000 and is to engage in the manufacture of motor car, airplane, and tractor engines. The company has plans also for placing a light passenger car on the market soon. Clarence F. Jamison, Lafayette, Ind., formerly assistant general manager of the Elgin Motor Corp. of Chicago, is president; Benjamin F. Cline, formerly with the Elgin, vice-president; Courtney M. Mitchell, Cleveland, Ohio, chief engineer; C. E. Manning, experimental engineer; and U. P. Deliart, purchasing agent.

BUICK DRIVEN 250,000 MILES

Detroit, Oct. 5—The Hyatt Roller, the Buick car which the Hyatt Roller Bearing Co. sent on a trip throughout the country despite the fact that it was built in 1908 and still contained the original Hyatt roller bearings, is now on the last lap of its 12,000-mile jaunt and will arrive in Detroit this week. The car has traveled more than 250,000 miles since it was made.

69,986 SEPTEMBER FORDS

Detroit, Oct. 5—The Ford Motor Co. produced 69,986 cars in September. This is an increase of 17,267 over September, 1916.

The Accessory Corner

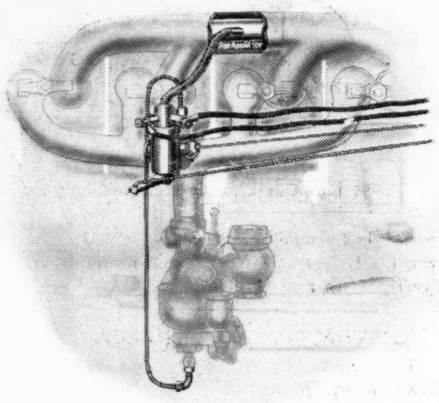
A part of the accessory descriptions on this and the following page are of articles exhibited at the recent accessory show for Ford cars in Chicago

THE Perfection 5-in-One vitalizer is designed as a heating unit for the purpose of thoroughly vaporizing gasoline. It consists of a combination electric super-heater, primer, accelerator, exhaust super-heater and decarbonizer, all in one and can be attached to any make gasoline engine. The electric super-heater is controlled by a switch on the dash and is an instant vaporizer, enabling the driver to start a cold engine instantly, irrespective of temperature. The device is said to show a large increase in mileage per gallon due to its efficieney in assisting the carbureter more thoroughly to crack the gasoline. Cars without storage batteries can use four dry cells for the super-heater. As the illustration shows, the device is mounted above the carbureter with connection to the float chamber of the carbureter, from which gas is taken into the device that on starting is heated electrically, or that is heated from the exhaust when the engine is hot. It is marketed by the American Spring Tire Co., 30 West Lake street, Chicago, at $10.

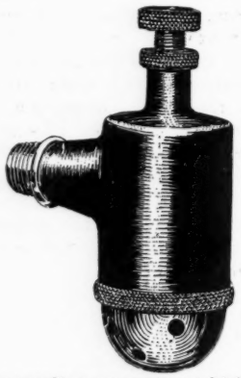
Making a Ford Underslung—William Dominick & Co., 1607 Prairie avenue, Chicago, is marketing equipment for underslinging a Ford, which consists of four parts. First the body is removed from the car, also the rear guards, side shields and muffler. Next the frame is blocked up about 2 ft. from where it is to be cut. At a point 13 in. from the rear spring the frame is sawed down and backwards at an angle of 45 deg. Holes are bored in the frame to correspond with the holes in the Domelco steel plates. These plates are put on the inside of the frame and bolted. This drops the frame 2, 3 or 4 in. as desired, two on the touring car, three on the roadster and four on the speedster. Next the front of the car is jacked up, radius rods, spring hangers and perches removed. Radius rods are pushed back to fit into the lower socket of the equipment and place the springs on a part of the equipment provided for this purpose. A japanned plate is furnished for attaching the mudguards and a hole is cut in the floor at the rear to accommodate the rear springs. Price, $20.

Schmidt Internal Grinder—The B. L. Schmidt Co., Davenport, Iowa, is producing an internal grinder designed for very accurate and rapid work. It is made for the better class of garages and its range of work is from 2½ to 8 in. in diameter and up to 15 in. in length. The grinder occupies a floor space of 5 by 3 ft. The length of the bed is 55 in.; width, 15⅝ in. The grinder weighs 1900 lb. and sells for $750.

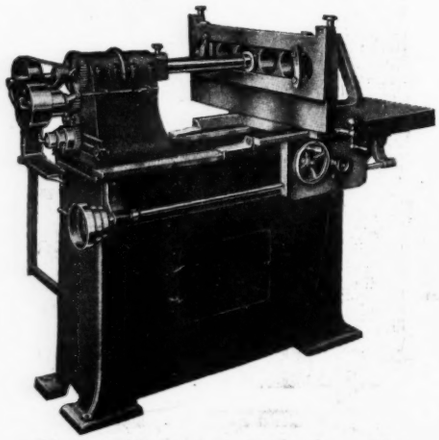
Rite-Lite Anti-Glare Lens—Rite-Lite lens consist of a series of thin, waterproofed fiber planes, mounted in the lower portion of a rust proof metal casing which is attached directly to the front of the headlamp. Thus the planes form an opaque screen for all the light which would normally go above the horizontal plane passing through the center of the lamp. This light is deflected by the under side of the planes and thrown to the ground ahead of the car. All of the light from the reflector is constantly used, none of it being diffused or scattered. In tests with 18 cp. bulbs, good illumination has been secured 200 ft. ahead of the machine over a 20-ft. roadway. The planes come both in ivory finish and also in red, white and blue. The planes are made by the Hale-Greene Co., 1822 Prospect avenue, S. E., Cleveland, Ohio.



The Perfection 5-in-One vitalizer, showing method of attaching



Empire gasoline economizer, which screws in intake manifold and is said to save 10 to 40 per cent in fuel consumption



The Schmidt internal grinder for use in large garages and repair shops

Delta Spotlight—The Delta Electric Co., Marion, Ind., markets a spotlight and trouble lamp for Ford cars exclusively. As a spotlight and attached to the Ford windshield, the device can be moved in any direction, gives a strong light and is easy to manipulate. As a trouble lamp it can be detached from the windshield and used for illuminating anything the driver wishes to do about the car. It operates on two dry cells which are contained in a case placed on the dash of the cash. Due to the construction of the lamp the dry cells are said to last for a long period and the lamp is built to withstand hard usage. It sells for $3.75.

Empire Gasoline Economizer—By automatically regulating the air supply exactly in accordance with the engine speed and atmospheric conditions, E. McCann, 110 East Twenty-third street, New York, claims for the Empire gasoline economizer a saving of from 10 to 40 per cent in gasoline consumption. Running fast or slow, the amount of oxygen admitted by the economizer is such as has been found proper by engineering test. It is placed in the intake manifold as closely to the carbureter as possible. Among other things claimed for the device by the maker is that it gives better acceleration, smoother running, clean plugs, hotter sparks, acts as an air brake on down grades, cools the engine and saves wear and tear on brakes.

Ampeco Axle Stand—The Ampeco rear axle stand holds the work firmly no matter what the repair, it is claimed, and the assembling of the differential is made easy by its use. A grease pan is fastened to one of the uprights, which catches the lubricant from the differential housing when the latter is taken apart. Metal is used throughout in the construction of the stand and the latter is bolted permanently to the floor. Price, $24, and shipping weight, 140 lb. American Machine Products Co., Marshalltown, Iowa.

Cork Insert Fan Belt—Cork insert fan belts make the fan turn with the engine by eliminating the slip. Circular pieces of cork are inserted into the leather belt, which is then waterproofed, stretched and backed up by heavy fabric. The corks are not affected by water, oil or dirt, and are said to retain their gripping qualities throughout the life of the belt. The company also makes cork insert transmission linings for Ford cars which are said to do away with jerky action upon starting or stopping the car. The buttons of cork set

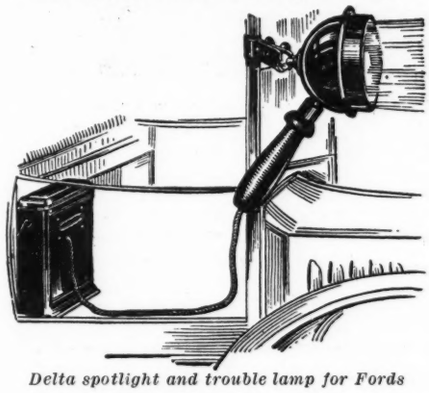
into the transmission fabric engage the drums with a positive grip, it is stated. The corks never become hard or polished and, therefore, keep their gripping qualities indefinitely. The fan belt sells for $1 for 1917 cars and all earlier models 85 cents. The transmission linings are $3 a set of three. Advance Automobile Accessories Corp., Chicago.

K. M. C. Transformer—This consists of a combination intake and exhaust manifold to which is attached a double vaporizing apparatus for gasoline and kerosene. Each system is independently controlled and the attachment it equipped with a small tank on the engine that has a capacity of 1½ gal. gasoline, used only for starting. As soon as the engine warms up a switch coming through from the carbureter to the floor board is used to make the change to kerosene. By having the intake manifold totally inclosed in the exhaust manifold ample heat is provided for a thorough vaporization of the kerosene, it is stated. The price of the complete installation is $40. Kerosene Carbureter Co., Chicago.

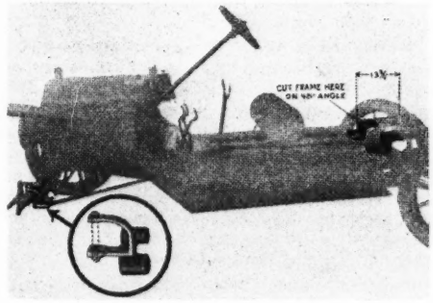
Bailey Gearless Differential—Unlike the conventional bevel gear differential, the Bailey has no gears. Instead it is fitted with a right and left hand ratchet attached to the ends of the axle shafts and are independent of the driving media. They are free to rotate within the differential housing. The pawls, which are round members with knobbed ends, are placed crosswise of the assembly and suspended on their lower sides by a projection from the center ring and above by a spring which fits into a spring cap in the housing. The pawls are the interlocking medium between the differential housing and the ratchet. The gearless differential gives a positive drive to both wheels on the straightaway, and when one wheel gets into trouble, such as mud or sand, it throws all the power of the engine into the other wheel. Neither wheel can travel slower than the engine. When turning a corner, as to the left, for instance, the right wheel starts to move faster than the left. This causes the right hand ratchet to move faster than the differential housing. The slant of the ratchet tooth pushes the end of the pawl out of the ratchet tooth and allows the ratchet to have a free forward movement. As soon as the corner has been turned and both wheels again start to revolve at equal speeds, the spring on top of the pawl pushes the end of the pawl back into a ratchet tooth. The end of the pawl wedges between the ratchet tooth and pawl and the drive is again positive. While this corner is being turned the opposite pawl to the one which is slipping over the ratchet teeth remains in engagement and drives that wheel. Bailey Non Stall Differential Corp., Chicago.

Special Gears—The Illinois Gear and Radiator Works, Chicago, is making gears that will either increase the speed of the Ford or give it more power. For speed, gears having a 3 to 1 or 2¾ to 1 ratio are furnished. If more power is wanted, or where year-round driving through heavy sand, clay or snow drifts is indulged in, a 4 to 1 set is furnished. The higher gear ratio is said to give greater speed for each motor impulse, and it is said that the fuel consumption will be decreased, due to the fact that engine racing is done away with. The gears are made of nickel-steel, hardened and sand blasted. Both ring gear and pinion are interchangeable with the stock Ford set. Price, $12.50.

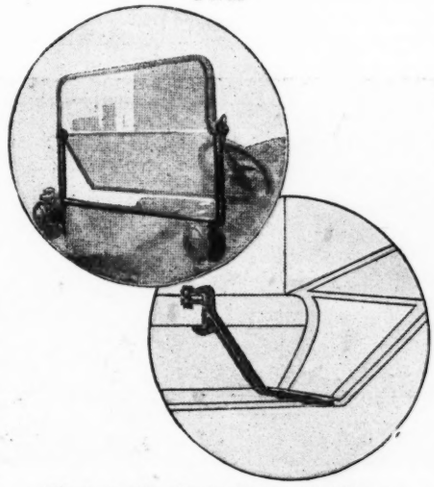
Rite-Lite anti-glare headlight device showing appearance on and off the lamp



Delta spotlight and trouble lamp for Fords



Domelco underslinging attachments for Fords



Above is the Shurnuff windshield ventilator for Fords and below the running board support, also for Fords

Alweather Protector—The Metal Specialties & Mfg. Co., Chicago, offers a device for Ford cars known as the Alweather protector, which slips over the foot pedal openings, keeping out the cold air in winter and heat and dust in summer. Slots are cut in the rubber for the pedals to work in and the protector is fastened to the floor boards by screws which pass through the metal plate. A similar protector is made for the opening in which the hand lever works.

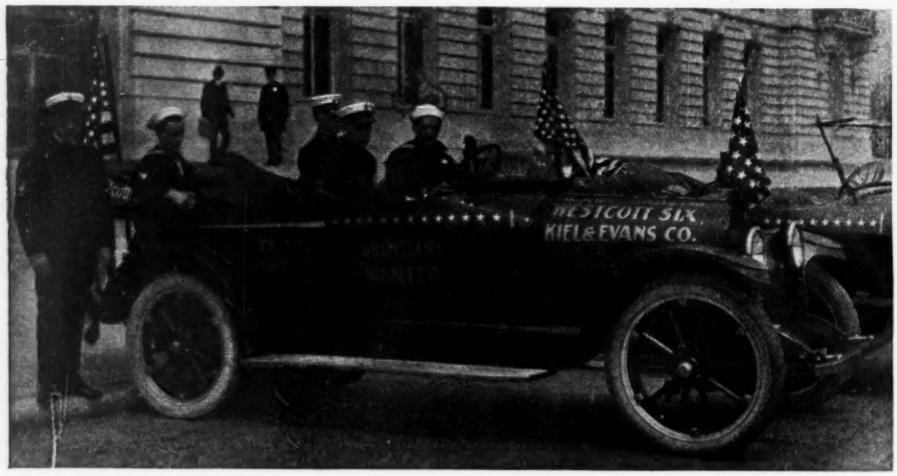
Trojan Front Wheel Bearing—These bearings take the place of the regular Ford cup and cone type. No machine work is required to install them, for they are fitted with inner rings which are forced on the spindle after which the rollers, which are held in retainers, are put in place. Two cups, or outer rings, are placed in the hub housing, after which the wheel can be slipped on the spindle. Slight backward and forward movement is given the wheel to set the rollers in the proper place. The outer nut is then replaced in the same manner as before. The bearings are lubricated by hard grease placed in the hub. When in place the rollers run on a taper to take the wheel thrust. Ahlberg Bearing Co., Chicago.

Shurnuff Windshield Ventilator—This ventilator consists of two black enameled metal uprights attaching to the hinges in the center of the present Ford windshield and fastening to the cowl. The sides of the shield are rain-proofed by a metal and rubber strip. A handle is furnished on the lower sash for pulling it back. The Shurnuff ventilator can be used in connection with windshields on the 1915, 1916 and early 1917 models. The late 1917 and 1918 Fords require longer side arms. The ventilator weighs 11 lb. Price, $7.50. Shurnuff Mfg. Co., St. Louis, Mo.

Running Board Support—The Shurnuff running board fender support consists of two metal arms, one end of which is attached to the frame of the car, the other to the front part of the running board. A lug fastens it to the frame and special bolts replace the front running board bolts. It can be attached to any Ford in less than an hour, it is claimed, and no holes need be bored for it. These supports fit all models and sell for $4.50. Shurnuff Mfg. Co., St. Louis, Mo.

Junior Headlight Controller—This instrument is installed in 10 min. by utilizing one of the bolts at front top water connection on the Ford engine. In operation the right hand lamp can be cut out automatically, diverting all of the current into the left lamp at low speeds, or when the magneto is not generating enough current to produce two brilliant lights. When the speed is again increased the right lamp will automatically light again. Two wires are furnished with the device and all connections are made to the instrument. Price, $1.75. New York Coil Co., New York.

Among the Makers and Dealers



CALIFORNIA DEALERS' PATRIOTIC GIFT—Kiel & Evans, Westcott distributors in Oakland, Cal., donated this car to the U. S. Mr. Kiel's son is a member of the Naval Reserves, and is shown at the wheel

FLINT Leaves J. C. Wilson Co.—H. J. Flint, general sales manager of the J. C. Wilson Co., truck maker, has resigned.

Walton Leaves Master Carburetor—A. B. Walton, sales manager of the Master Carburetor Corp., resigned Oct. 1. Mr. Walton will announce his future plans later.

Applin Is Promoted by Cadillac—J. W. Applin, assistant to D. McCall White, chief engineer of the Cadillac Motor Car Co., has been promoted to chassis engineer, succeeding L. K. Snell, who recently resigned.

Maxwell Promotes Pearson—George Pearson, Jr., who formerly was with the Pacific coast branch of the Maxwell Motor Co., has been promoted as supervisor of retail sales and will handle truck sales particularly.

Rose to Serve in Aviation Corps.—C. B. Rose, vice-president of the Velie Motors Corp. and for many years chief engineer, has gone to Washington to serve in the inspection bureau of the aviation corps.

Colt Heads New York Overland—William L. Colt has been appointed manager of the Willys-Overland branch in New York and will assume his duties Oct. 15. Mr. Colt has been eastern sales manager for the Cole Motor Car Co., in addition to having an interest in the Colt-Stratton Co., distributor for Dodge Brothers cars. In earlier days he himself was a motor car maker, having been president of the old Cleveland Automobile Co.

Lane Truck Builds First Model—The Lane Truck Co. has constructed its first 3-ton truck. The concern is located at Kalamazoo, Mich.

N. Y. Westinghouse Branch Transferred—The New York branch of the Westinghouse Electric & Mfg. Co. has been transferred to the P. J. Durham Co., who will consolidate all service work.

Morris Now With Monitor Motors—R. S. Morris has became production manager of the Monitor Motors Co., Columbus, Ohio. Mr. Morris formerly was associated with the Packard Motor Car Co., of Detroit.

More Daylight at Flint—The Flint Manufacturers' Association has decided to retain eastern time in all of the factories despite the fact that the common council adopted eastern time for the city only for the months of July, August and September.

Packard Takes Stock of Agencies—The Packard Motor Car Co. has just determined that more than $20,000,000 is invested in plants and stocks by Packard dealers, who transact a gross business of $70,000,000 a year and employ 6455 workers. More than $11,000,000 of this investment is represented by buildings, and $4,676,000 worth of building construction is now under way.

Paige to Assemble in New Building—The Paige Motor Car Corp. will use the four-story building and basement, which it recently acquired from the Williams Brothers Pickling Co., for assembling of closed cars and for chassis and final assembly work.

Martin Now with Cassidy—A. L. Martin has joined the staff of the Edward A. Cassidy Co., New York, as western manager with headquarters at San Francisco. Mr. Martin was formerly sales and accessory manager of the Western and General Tire & Rubber companies for six years.

G. M. to Build $300,000 Plant—The General Motors Co. has completed plans for the construction of a new drop forge plant to cost about $300,000 and consisting of three one-story buildings, 160 by 600 ft., 75 by 60 ft. and 65 by 300 ft. It is also arranging for the erection of a new factory at Flint, Mich.

Stanley Motor Declares Dividend—The Stanley Motor Carriage Co., Newton, Mass., has declared a dividend on preferred stock of 7 per cent, payable Oct. 1 to stockholders of record Sept. 25. Since the new management assumed charge May 5, earnings have been seven times first preferred dividend requirements.

Miller to Manage Mason Branch—Lee O. Miller has been appointed manager of the New York branch of the Mason Tire & Rubber Co., Kent, Ohio. Mr. Miller was with the Kelly-Field company after it took the output of the Lee Tire & Rubber Co. until last December, when he joined the Mason Tire & Rubber Co.

Moreland Truck Begins New Plant—The Moreland Truck Co., Los Angeles, Cal., has started the erection of the first unit of its new plant at Burbank. The new works, to cost over $500,000, will be devoted in part to the manufacture of tractors of both high wheel and caterpillar types suitable for light and heavy work, ranging from 30 to 75 h.p.

Wayne Oil Tank Promotes Beall—J. B. Beall, for the last two years manager of factory sales for the Wayne Oil Tank & Pump Co., Fort Wayne, Ind., has been appointed manager of the new branch at Cleveland, Ohio. J. D. Rauch, for the last two months engineer, succeeds Mr. Beall as manager of factory sales. Three additions have just been completed by the Wayne

SWINEHART INNER TUBE PULLS SIX CARS ABOUT STREETS—This two-page wide photograph is not a parade but a tire test more than 6 tons, dead weight

company, doubling the floor space. Four acres have been purchased and will be used for another addition.

Colburn Resigns Dorris Office—Webster Colburn, second vice-president of the Dorris Motor Car Co., St. Louis, Mo., has severed his connection with that company to take up a new venture which he is not yet ready to identify.

Meyers Succeeds Mitchell at Indianapolis—C. L. Myers has been appointed division manager of the Prest-O-Lite Co., Indianapolis, in the Milwaukee territory, succeeding C. F. Mitchell, who has been transferred to Memphis, Tenn.

Goodfellow Joins Nice Ball Bearing—Arthur N. Goodfellow has been appointed western sales manager for the Nice Ball Bearing Co., Philadelphia, Pa., with offices at Detroit. Mr. Goodfellow formerly was associated with the Standard Roller Bearing Co.

Standard Steel to Make Wheel—The Standard Steel Castings Co. has entered the cast steel wheel field for motor cars. A plant with a capacity of 400 wheels daily will be built. A 20-acre tract of land will be used. The company recently increased its capital to $1,000,000. Julius F. Janes is president.

Mason Tire Holds Convention—The Mason Tire & Rubber Co. is holding a general sales convention this week, which includes the entire sales force throughout the United States. An elaborate program for the meeting was arranged, the principal event being a dinner this evening. All phases of marketing the Mason tire will be discussed, as well as problems that confront the salesmen. The company will double the capacity of its plant to take care of a product of 1500 tires a day.

Timken-Detroit Axle Adds—The Timken-Detroit Axle Co., Detroit, is building a one-story steel frame storage building, 50 by 108 ft.

Weldman Resigns from Standard Truck—J. B. Weldman has resigned as advertising manager of the Standard Motor Truck Co., Detroit.

Shockey Is Ordered to Report—Lieutenant H. G. Shockey, president of the Denby Detroit Sales Co., has been ordered to report for duty in command of a motor truck company at Camp Custer.

Tice Now in Consulting Work—P. S. Tice, who has been in the experimenting department of the Hupp Motor Car Corp., has severed his connections and now is doing consulting work.

Oakland Equips with Cassco—The Oakland Motor Car Co. has placed a special equipment contract with the Edward A. Cassidy Co., New York, for 10,000 Cassco engine-driven tire pumps.

Five Trainloads of Buicks for Coast—Five solid trainloads of Buicks, including more than 1000 cars, all on the way at one time and all consigned to the Howard Automobile Co. of San Francisco, arrived at San Francisco recently.

New Departure Holds Barbecue—Thirty-five hundred men attended the field day and barbecue of the New Departure Mfg. Co., Bristol, Conn., recently. The New Departure band of forty pieces and chorus of seventy-five entertained with a concert. Inter-departmental contests and a costume parade were included in the day's events.

Buhl Builds $500,000 Plant—The Buhl Stamping Co., Detroit, is building a $500,000 plant which will open soon and which contains 6 acres of floor space.

Republic Truck 1917 Sales 12,917—The Republic Motor Truck Co., Alma, Mich., in the year ended June 30, 1917, sold 12,917 trucks, as compared with 3851 in 1916.

Ewing Joins Michigan Copper—Alonzo P. Ewing has been appointed vice-president and general manager of the Michigan Copper & Brass Rolling Mills, Detroit. The company has orders booked which will assure operation at capacity until sometime next June.

Vogler Becomes Captain in Army—H. J. Vogler has resigned as metropolitan wholesale manager of Willys-Overland, Inc., to accept a commission as captain in the ordnance section of United States Army. Captain Vogler has been in the motor industry for ten years.

Cosgrove to Manage Atlas Truck Sales—A. R. Cosgrove has been appointed sales manager of the Atlas truck division of the Martin Truck & Body Corp., York, Pa. The Martin corporation now manufactures the Atlas commercial car in thirty-five different body styles.

Moline to Build New Tractor—The Frost Gear & Machine Co. has contracted with the Moline Plow Co. to manufacture gears for a new tractor which the Moline company will place on the market. The Moline Plow Co. is building a new plant and has a schedule for 21,000 tractors for 1918.

Recent Incorporations

Alliance, Ohio—Alliance Armature & Motor Repair Co.; capital stock, $10,000; incorporator, William G. Richards.

Cleveland, Ohio—M. R. Motor Car Co.; capital stock, $12,000; incorporators, Marcellus Reid, W. A. Grigsby, W. H. Foote, J. A. Manning and R. W. Jeremiah.

Columbus, Ohio—Columbus Steel Products Co.; capital stock, $50,000; incorporators, S. A. Webb, M. A. Corbett, Harry B. Redding, F. E. Sanborn and H. C. Creith.

Collins, Wis.—Collins Motor Co.; capital stock, $10,000; to deal in motor cars, trucks, tractors, gas engines, etc.; incorporators, M. S. and G. W. Valleskey, John Draheim and H. A. Allhiser.

Findlay, Ohio—Star Tractor Co.; capital stock, $100,000; to build farm tractors; incorporators, J. E. Bicknell, C. L. Casterline, C. E. Jordan, C. A. Schubert and F. H. Gerdeman.

Lake Geneva, Wis.—Lake Geneva Motor Co.; capital stock, $10,000; incorporators, T. E. Stuyvesant, Arnold J. Stuyvesant and T. E. Stuyvesant, Jr.

Madison, Wis.—Washington Motor Car Co.; capital stock, $5,000; incorporators, Charles F. Bender, E. G. O'Brien and E. H Whitcomb.

Madison, Wis.—Benson Speed Signal Co.; capital stock, $100,000; to manufacture and sell signal devices for motor cars, trucks, etc.; incorporators, Louis Weidenbeck, Hal R. Martin and A. D. Campbell.

Milwaukee, Wis.—Wisconsin Gear & Axle Co.; capital stock, $100,000; to manufacture gears, axles, etc., for passenger and commercial cars, tractors, etc.; incorporators, Herman W Noll, Jacob Scharmer and Bernard A. Hoermann.

Milwaukee, Wis.—Wisconsin Oil & Gas Development Co.; capital stock, $93,000; incorporators, Ernest L. Bond, Burrill L. Carey and Fred E. Barry.

Milwaukee, Wis.—Premier Sales Co.; capital stock, $10,000; incorporators, Fred J. Chlupp, Louis J. Goldman and B. A. Wille.

Milwaukee, Wis.—Milwaukee Motor Sales Co.; capital stock, $10,000; incorporators, E. G. Wurster, Arme Borst and G. C. Gessner.

Milwaukee, Wis.—Sanger Automobile Co.; capital stock, $50,000; incorporators, William F. Sanger, Casper H. Sanger and Louis Quarles.

Milwaukee, Wis.—Motor Truck Service Co.; capital stock, $25,000; incorporators, August J. Fischer, Benjamin F. Dalgleish, William H. Weber and Charles F Setzko.

Milwaukee, Wis.—Titan Truck & Tractor Co.; capital stock, $100,000; incorporators, Joseph C. Millman, R. S. Boomer and Henry F. Millman.

Milwaukee, Wis.—Detroit Auto Radiator Co.; capital stock, $10,000; to manufacture and repair radiators, fenders, etc.; incorporators, Joseph Colker, Mollie Colker and Louis L. Cohen.

Milwaukee, Wis.—Western Engine & Dynamo Co.; capital stock, $200,000; to manufacture engines, dynamos, generators, etc ; incorporators, John I. Beggs, Chester B. Pierce and Win H. Cameron.

Milwaukee, Wis.—American Auto Body Co.; capital stock, $40,000; incorporators, David J. Borun, Henry E. Bradley and L. L. Gridley.

Newark, N. J.—Western Aero Corp.; capital stock, $250,000; to manufacture airplanes, engines, etc ; incorporators, C. W. Johnson, G. A. Eckstardt and J. W. Eckstardt.

Newark, N. J.—A. C. Belknap, Inc.; capital stock, $100,000; to manufacture engines, motor car parts, etc.; incorporators, A. C. Belknap, Frank Van Syckle and Harold Van Syckle.

Philadelphia, Pa.—Fox Motor Ca.; capital stock, $100,000; incorporators, F. R. Hansell, J. Vernon and S. C. Seymour.

Racine, Wis.—Ton-A-Ford Trux Co.; capital stock, $200,000; incorporators, Herman R. Swanke, George Beardsley, Frederick and Louis Boldig.

Superior, Wis.—Automobile Ice-Box Mfg. Co.; capital stock, $50,000; incorporators, Gustaf Engelbrekt, Fritz Henderson and Erick G. Hoglund.

Superior, Wis.—Automatic Machine Co.; capital stock, $25,000; incorporators, Gustaf Engelbrekt, Nels L. Jensen and Theodore Moronk.

Watertown, Wis.—Lasure Friction Clutch Co.; capital stock, $60,000; incorporators, R. L. Richardson, A. D. Platz and B. M. Parson.

Waupaca, Wis.—Jorgenson Mfg. Co.; capital stock, $70,000; to manufacture and sell machinery, tools, etc.; incorporators, P. J., A. K. and C. H. Jorgenson.

...erformed at Topeka, Kan., in which a Swinehart inner tube pulled four cars uphill and downhill. An engineer figured the pull as ...oing up a bridge approach

From the Four Winds

WHEN THE SKY RAINS MOTOR CARS—This picture looks as if it might be upside down on first glance. It is not, though. An Oklahoma cyclone simply came along and carried a car 600 ft., dropping it upside down. Two wheels are gone and the body is wrecked, but the owner has hopes for engine

ATLANTA to Show at Fair—The Atlanta, Ga., show this year will be held during the Southeastern fair Oct. 13-20. An entire building will be devoted to the cars and accessories, giving in all 40,000 sq. ft. of floor space.

Goodyear Wins in Canadian Run—A Canadian car, a McLaughlin, won the Ottawa Journal's reliability run from Ottawa to Alexandria Bay, N. Y., but American tires helped win it, for the car was equipped with Goodyears. Forty-seven cars entered the contest, and forty-three of them finished, two of which had perfect scores. Dr. R. E. Valin was the driver of the victorious car.

Would Stop Car Thefts—The city officials at Dallas, Tex., are considering a law whereby car thefts may be stopped. The ordinance is similar to that proposed at Cleveland, which would require all gasoline stations to be licensed and their operators compelled to keep an accurate record of all gasoline sold, together with the make of the car as well as the license number, and to report these daily to the police.

Washington Uses Trucks for Shipments—Merchants of Washington, D. C., are turning to motor trucks for transportation purposes between that city and New York, Baltimore and Philadelphia, due to demands on the railroads for shipping purposes. As there is little prospect of the freight congestion being relieved, most all the big Washington merchants are expected sooner or later to adopt the plan.

St. Louis Tests Headlights—Car owners in St. Louis can have their headlights tested officially now. The lights are tested by photometer, set to determine lights of the proper brilliancy. A few nights ago the street commissioner, chief of police, president of the police commissioners and the police court judge went out in a car and drove until they met a car with its lights adjusted correctly. This driver then was asked to go to the city hall, where the photometer was set by his lights. All tested lamps, if approved, are marked with a small red disk on the glass, varnished over for protection.

Arkansas Has 12,000 More Cars—An increase of 12,000 motor cars in Arkansas this year is noted by the state highway commission. The tags issued are: 27,517, 1917; 15,400, 1916; 8922, 1915. The commission adds that a large percentage of the new licenses have been issued to farmers.

Los Angeles Enforces Headlight Law—To bring about the enforcement of the new law regulating headlights and spotlights on motor vehicles, a moonlight court has been in progress nightly at Los Angeles, Cal. The police were lenient in the enforcement of the measure, and thousands of motorists neglected to make their lights conform to the law. Those who had, filed protests with the result that a crusade against offenders was instituted, and dozens of them were brought into court each night and fined. Included in the number was a court judge, who drove his car into the yard of the city hall to find out what all the excitement was about.

Claim Adulterated Gasoline—Texas is having some little trouble about its gasoline just now. Complaints of adulterated gasoline sales have been made from different parts of the state, and it has become so bad in Dallas an ordinance requiring gasoline to come up to certain standards may be passed.

Sells Accessories a la Cafeteria—A Chicago department store, Rothschild's, has applied the cafeteria plan of selling food to the merchandizing of motor car accessories. Customers help themselves from a large counter, take the goods to a clerk and pay for them. Each article is marked with the price. One clerk does the work of four under the old system.

Who Has the Most?—Wisconsin now claims sixth place in the per capita ownership of motor cars in the United States, with a total of 160,000. Illinois, with its 320,000 cars, now has one to every 19.4 persons, which gives it a little better than tenth place, which was its standing the first six months. Iowa still leads with one car to every nine persons, with Nebraska second, California third, Kansas fourth and Minnesota fifth.

Dance Opens New Garage—When Elmer E. McDaniel, for years a prominent horseman of Delaware, decided to forego the pleasures of exploiting Dobbin and build a garage he determined to do it in style. So as a prelude to his new field he gave a dance at his garage. In making the change of occupation Mr. McDaniel has fitted up a parlor in his garage for the members of his horse senate, who are expected to transfer their affections with time to horsepowers instead of horses.

Ninety-Five to Show at Denver—Forty-five motor car and fifty accessory dealers have applied for space in the show at Denver Nov. 12-18. During the week of the exhibition a convention of all Colorado dealers will be held to perfect a state motor trade association. Delegations from the larger centers are planning to attend together. The show will be under the auspices of the Denver Civic Association, Auto Trade Division, with G. A. Wahlgreen as general director.

Wisconsin Advocates Motor Fire Apparatus—Predictions were made at the annual convention of the Wisconsin League of Municipalities at Racine, Wis., that within a few years horse-drawn fire-fighting equipment will be a thing of the past in Wisconsin. The convention devoted an entire session to a discussion of motor-propelled equipment, and the experiences related by delegates from nearly forty cities were enthusiastically in favor of these types as a matter of economy and efficiency, their operation showing not only an enormous saving in expenses of maintenance but a large reduction in the fire loss. Northern Wisconsin delegates recommended that cities which are subject to heavy snows should purchase quadruple-drive equipment.

Milwaukee Protects the Silent Force—The Milwaukee common council has adopted an ordinance which makes it a misdemeanor for any motorist or other person to upset or displace a "silent policeman," or mechanical traffic post, unless the device is placed immediately in its proper position. Some time ago several important intersections were provided with posts and pillars, the traffic not warranting the stationing of a traffic officer. The ordinance defines a "silent policeman" as follows: "Any traffic-directing signal post, movable in character, duly placed by any officer or employe of the city of Milwaukee, properly authorized so to do, at intersections of streets." The fine for violation is not less than $1 nor more than $10.

Coming Motor Events

CONTESTS

*Oct.	13—Chicago speedway race.
Oct.	15—Richmond, Va., track race.
Oct.	27—New York speedway race.
*A. A. A. championship award event.	

MEETINGS

Jan.	11-16—New York, National Association of Automobile Accessory Jobbers, convention.

SHOWS

Oct.	6-13—Boston.
Oct.	6-13—Cincinnati, Ohio.
Oct.	8-13—St. Louis.
Oct.	9-12—Toledo, Ohio.
Oct.	13-20—Atlanta, Ga.
Oct.	13-28—Dallas, Tex., state fair.
Oct.	14-28—Dallas, Tex., state fair.
Nov.	5-12—Los Angeles, Cal.
Nov.	12-18—Denver
Dec.	3-8—Akron, Ohio.
Jan.	5-12—New York.
Jan.	19-26—Montreal, Canada.
Jan.	26-Feb. 2—Chicago.
March	2-9—Boston.